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THE THERAPEUTICS OF THE INTERNAL SECRETIONS.*

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THE various theories which have been deduced from experimental, pathological, and clinical observations of the functions of the ductless glands, together with a review of the results of therapeutics in their various diseases, based upon such theories, will be presented in this paper.

Although it has long been surmised that the secretions of the ductless glands were of vital importance to the bodily economy, it is only lately that they have been shown to rival in their *rôle* the part played in metabolism by the glands provided with ducts, such as the liver and pancreas.

The Thyroid Gland. Experimental, pathological, and clinical investigations have demonstrated the vital importance to the economy of the physiological function of the thyroid gland. Defective development, pathological changes, destructive or otherwise, and experimental removal, induce a train of well-known symptoms which necessitate the acceptance of one of two theories as to the nature of its function:

1. That its office is chiefly, if not wholly, a secretory one; that it furnishes some material which enters the blood, probably through the lymphatics, and which is essential for the chemistry of metabolism and for the proper nutrition of the various tissues.

2. That its function is to neutralize or destroy certain poisons which

* Being a contribution to the discussion upon "Internal Secretions" at the Triennial Congress of Physicians and Surgeons, Washington, May 5, 1897.

result from tissue-changes, and which, by their tendency to accumulate in the blood, induce auto-intoxication.

The arguments, and they are many, which may be advanced in favor of either one of these theories, will be more properly considered in the papers devoted to the physiological and pathological aspects of the subject. Experimental and clinical observations have demonstrated that the *specific* function of the gland, whether it be to aid metabolism or to develop an antitoxin, can be replaced by a suitable dosage of extracts or preparations of the normal gland administered subcutaneously or by the digestive tract. If the specific purpose of the gland is antitoxic, it is thus evident that this function can be effectively exercised in the blood-current or tissues, even if normally it is partly or chiefly effected within the gland-substance.

In diseases, therefore, which have been shown to be due to a loss of function of the thyroid gland, myxœdema, cretinism, both sporadic and endemic, and operative myxœdema (*cachexia strumipriva*) the indication for treatment is direct, and the results are among the most brilliant examples of the value of a therapeutics which is based upon experimental pathology.

The number of cases of myxœdema treated with the thyroid preparations is already very great, and experience justifies the formulation of many practical rules in this method of therapeutics. The most important of these rules were to be inferred from the pathology of the disease. Although the myxœdematous symptoms are speedily removed by the treatment, a discontinuance of the treatment is certainly followed by a return of the myxœdema at varying intervals, showing that the treatment does not cause the gland to resume its function, but exercises its influence by introducing into the economy something which it is presumably the function of the gland to supply. It has been shown conclusively, first, that complete recovery can be effected even after the disease has existed for as long a period as fourteen years and in the case of patients bed-ridden and presenting the gravest symptoms; and, secondly, that the maintenance of health can only be secured by continuous treatment during the lifetime of the patient. The requisite dosage after the removal of the myxœdematous condition has been found to vary, and depends upon the degree of loss of glandular function. Equally good results are obtained from a single daily dose or a larger dose given at longer intervals. It has been found that this interval rarely can exceed a week.

The complete restoration of physical strength, aside from the general well-being of the patient, is well illustrated in a case of Murray's,¹ a male, who from being practically disabled, at the end of two years after the beginning of treatment was able to make the ascent of a mountain 3000 feet high, including a walk of ten miles, without any undue fatigue.

It may be of interest to refer to the subsequent history of a woman, forty-three years of age, under my personal care, who was among the first to be treated by thyroid preparations in this country (1892). The disease had existed for twelve years; she had been bed-ridden for a year; she had lost her hearing, was hairless, and suffered from marked mental hebetude and grave physical prostration. After the marvellous improvement usually effected in the first few weeks of treatment she continued to improve, and for the past two years she has admirably filled a responsible librarian's position in addition to performing easily all the duties of the head of a household. Her hearing is perfect; she has a new growth of hair of the finest fibre reaching to her waist, and the brilliant coloring and texture of skin rarely seen except in youth. She maintains her present condition of health by taking the equivalent of five grains of the fresh sheep's thyroid twice weekly.

Cretinism, sporadic and endemic. Continued experience during the few years which have elapsed since the treatment of cretinism with thyroid preparations was first instituted has confirmed the hopes which were originally entertained of its efficacy. It has been shown conclusively, first, that in sporadic cretinism the myxœdematous symptoms can speedily be removed, thereby effecting a marvellous improvement in the frightful deformities incident to the disease; secondly, that the treatment is capable of developing the natural tendencies of the growth of the skeleton which were in abeyance, and that this latent capacity is in apparent inverse ratio to the age of the patient; thirdly, that a striking improvement in the mental condition is effected, although occurring more slowly and in a similar inverse ratio to the age of the patient, as observed in the skeletal growth. The rate and degree of the growth of the skeleton at different ages are strikingly illustrated in the cases of cretinism reported by Thomson² at the last meeting of the British Medical Association. In the case of a child, five years of age, who was seven inches below the normal height at the beginning of treatment, the growth was five and three-quarters inches in the first year of treatment, four and one-quarter inches in the second year, and two and one-half inches in the third year. In a girl of eighteen years the growth was four and three-quarters, two and three-eighths, and one and three-eighths inches in the first, second, and third years respectively. And, finally, in two adult cretins, thirty-six and thirty-nine years of age, the growth in one was three-quarters of an inch and five-eighths of an inch in the first and second years, and none in the third; in the other, one and seven-eighths and three-quarters of an inch represented the growth in the first and second years, and there was no further growth in the third. These results are very similar to those reported by many other observers.

The radiograph has been utilized by Hertoghe for purposes of prognosis in cases of this kind. The completeness or incompleteness of ossi-

fication, demonstrable in this way, indicates the possibility of further skeletal growth.

An interesting point in the skeletal growth is that, as the child approaches the height normal at a definite age, continuous growth apparently is only at the usual rate. In the very rapid growth of the bones a tendency to softening, resembling that which occurs in rickets, has been noted by several observers, and has been ascribed to the use of doses of the thyroid extracts which were probably too large. It is, perhaps, too soon to speak positively of the degree of mental improvement attainable; but already cases of cretinism in children have been reported where the intelligence after three years of treatment has compared favorably with that of normal children of a similar age.

In view of the facts related it is not unjustifiable to conclude that the treatment of cretinism with the thyroid preparations, if initiated early in the disease and systematically continued, holds out every promise of the child's development into a healthy adult.

The therapeutic value of thyroid preparations in cretinism has suggested their use in cases of idiocy more or less resembling in bodily and mental defects the cretinous condition.

Bourneville has shown that the weight of the thyroid gland varies very considerably in different cases of idiocy.

Telford Smith¹ has tried the treatment in idiots belonging to the Mongol type, who most closely resemble the cretin. His experience has been that a physical and mental improvement occurs, and that it is inversely to the age of the patient; that the improvement is neither so rapid nor so marked as in the cretin. There is some improvement in the condition of the skin; it desquamates, but does not become normally smooth; chronic marginal blepharitis improves and in some cases is cured. Growth improves as well as the mental condition.

Goitre. Turning from a consideration of the thyroid treatment in pathological conditions necessarily involving a loss of function of the thyroid gland to other morbid conditions in which its function may be variously affected, goitre first attracts our attention.

The benefit derived from the use of the thyroid preparations in cases of goitre in which the absence of constitutional symptoms indicates that the function of the thyroid gland is still largely preserved, has not been satisfactorily explained. The benefit consists in a retrogression of the goitre through atrophy of the hyperplastic and adenomatous tissues.

The maximum improvement is obtained in goitre of the simple hyperplastic form, although adenomatous nodules in many instances shrink in a striking manner. Large collections of colloid and cysts are apparently unaffected by the treatment. The diminution in the size of colloid goitres Kocher attributes to a shrinking of the parenchymatous tissue in which the colloid is imbedded. Although marked diminution in size

in the varieties of goitre which have been mentioned, and a corresponding improvement in the patient's general condition, occur, complete disappearance of the tumor has rarely been noted. The reports of various observers of the permanent improvement or cure are not sufficiently full to justify positive statements on these points at the present date. Recurrence of the tumor after partial or complete disappearance, at varying intervals after the discontinuance of the treatment, certainly occurs in many instances, and suggests the possibility that continued use of the thyroid preparations in a modified way for indefinite periods may be found necessary.

Bruns has reported 60 cases,⁵ non-malignant and non-cystic in character, treated by this method: 14 were cured, 29 were improved, and 17 were not benefited by the treatment.

In 21 cases reported by Knoepfelmacher,⁶ in 11, the patients varying from two to seventeen years of age, the retrogression of the goitre was marked, although in none was it completely removed; of these, 9 cases were of the hyperplastic type. In 5 other cases of colloid goitre a perceptible diminution in the size of the tumor was effected. In the remaining 5 cases no improvement was observed.

Angerer⁷ has treated seventy-eight cases with thyroid preparations, and claims that in all the cases in which the treatment was tolerated and continued for a period of several weeks diminution in the size of the goitre was attained. The most striking results were noticed in the soft goitres of the simple hyperplastic form, and especially in those occurring about the age of puberty. In cystic goitres, through the atrophy of the hyperplastic tissues, the cysts became more superficial, and their enucleation was thereby rendered more simple.

In eighty-three cases of Stabel's improvement was obtained in 92 per cent. In only two was there unquestionably permanent recovery. Stabel⁸ states that after the administration of thyroid substance was discontinued the tumor, in cases in which it had decreased, again began to increase in size at varying intervals of four to six weeks.

In explanation of the action of thyroid gland preparations in goitre, Bruns, Ewald, and others have suggested the hypothesis of a primary toxæmia of unknown origin, which evokes an increased functional activity of the gland, accompanied by hypertrophy. If the demand for thyroid products is supplied artificially, the gland retrogrades and atrophy results.*

Exophthalmic Goitre. *A priori*, benefit would not be expected from the thyroid preparations in exophthalmic goitre, as increased functional activity of the thyroid gland probably occurs in this disease, and the

* Bauman's isolation of an iodine-bearing compound (iodothyrene) from the thyroid gland secretion suggests an explanation of the value of iodine in the internal treatment of goitre.

preponderance of evidence indicates that their use is commonly attended with an aggravation of the symptoms.

In certain cases, however, the employment of thyroid extracts is unattended with any appreciable effect. The natural fluctuations of the disease, improvement alternating with recrudescences, suggest that the exceptional reports of *improvement* under this treatment have been based upon insufficient grounds.

Finally, the thyroid treatment has been employed in various pathological conditions in which a perversion of the function of the thyroid gland has yet to be proved.

Without such perversion it is probable, from the power of the active principle to quicken metabolic processes, that the treatment would be of value.

Insanity. The use of thyroid preparations in the treatment of various forms of insanity was originally based upon its undoubted power to increase ultimate cell-metabolism.

A relatively large number of cases treated by this method have been published. Bruce⁹ has reported 60 cases, 25 males whose ages ranged from twenty to fifty-five years, and 35 females whose ages ranged from twenty to fifty years. Of the males 7 recovered under treatment, and there were 17 recoveries among the females. Thirteen of these latter were either puerperal, lactational, or climacteric cases.

Bruce believes that the action of thyroid in insanity is a complex one:

1. That the feverish condition induced by it is of benefit to the patient.
2. That it acts as a direct cerebral stimulant.
3. That it supplies some material necessary to the economy which the gland is supplying in insufficient quantity.

Babcock has published twenty-two cases treated in the St. Lawrence State Hospital for the Insane.¹⁰ In four cases there was recovery; in eleven, improvement. The four recoveries were in patients suffering from recurrent mania and melancholia. Improvement was obtained in cases of acute mania and acute melancholia, in two cases of acute delirium, in a case of chronic mania, and in one of chronic melancholia. Relapses occurred in four cases. In one of these (chronic melancholia) relapses followed two successive treatments.

Allen Starr's¹¹ extensive experience has led him to place the highest value upon the treatment in a form of mental disturbance occurring at the climacteric. He describes it as a mental depression with anxiety and morbid fears, but without delusions or insomnia. Starr is inclined

* C. C. Starkey states that large doses of thyroid are of marked benefit in cases which threaten to become chronic, but that recovery should be allowed to become incurable without a trial of this method of treatment.

to believe that a functional disturbance of the thyroid and ovaries is associated in these cases.

These results correspond closely with those obtained by various other observers and indicate a decided advance in the therapeutics of certain forms of insanity. The favorable or unfavorable response to the treatment is even accepted by several distinguished alienists as affording a basis for prognosis in the large class of cases occupying "the borderland" between curable and incurable states.

Obesity. The literature of the thyroid treatment of obesity is already very voluminous. The number of published cases treated by this method during the past four years is large, and the results in general have been favorable.

The researches of Treupel, Grawitz, Roos,¹² and Hennig, among others, have shown that under the influence of the active principle there is a decided increase in the excretion of nitrogen as compared with the amount received in the diet.

In the discussion in the Fourteenth Congress for Internal Medicine Ewald stated that the thyroid preparations influenced metabolism *in toto*, without a selective action on the fats, and hence that there was an albuminoid waste which should be compensated for by an appropriate diet. In certain cases he had found the treatment to be without effect, an experience which harmonizes with that of other observers, and that its failure was observed not only in the class of patients which accumulated fat in spite of a careful dietary, but also where the obesity is the result of excessive indulgence. In such cases the fatty deposits lie beyond the limit of the control of the oxidation processes.

In patients who react to treatment the loss of weight varies from 1 to 5 kilogrammes (2 to 11 pounds) a week, without restriction of diet, but after a time a limit is reached beyond which further reduction is not obtained. The loss of weight is more rapid during the first days of treatment than later; subsequently it varies in amount from week to week, without explainable reason, the conditions of life remaining the same. The loss is usually unattended with any disturbance of health. As a rule, the discontinuance of treatment is quickly followed by an increase of weight, which shortly reaches its former level. Only exceptionally is the improvement maintained for any considerable period, although careful dieting and exercise prolong its duration.

Cutaneous Diseases. The expectations originally entertained of the value of thyroid treatment in diseases of the skin have not been fulfilled. Only in psoriasis has some small measure of success been obtained. Even in this disease the effects are uncertain; it is impossible to differentiate the type of the affection in which benefit may be expected, and in many cases an aggravation of the lesions occurs.

Phthisis. The suggestion of the possible value of thyroid prepara-

tions in phthisis rests on the slender basis of their temporary effects in some cases of lupus, upon the assumed antagonism of goitre and tuberculosis, and finally upon the atrophy of the thyroid gland in chronic, wasting diseases. Morin¹³ and Kraus claim favorable results from their use.

As early as 1893 the treatment was instituted in my hospital wards in carefully selected cases of pulmonary tuberculosis, and the conclusions reached were that it was absolutely without effect either upon the lesions or the general condition of the patient.

The use of thyroid preparations has been further extended, and claims of their therapeutic value in various other morbid conditions have been made.

Further careful investigation and corroboration are demanded before they can be finally accepted.

Attempts have been made by various investigators to isolate the specific principles of the thyroid. Exclusive of Fränkel's discovery of a substance of active properties, but which does not prevent the occurrence of the chronic cachexia, Baumann has isolated an iodine-bearing compound of albumin and globulin, which he has named "Iodothyryne."¹⁴ He believes it to represent the total specific activity of the glandular extract, which he makes dependent upon the amount of iodine it contains.

R. Hutchinson¹⁵ has within the last few months published the results of his investigations into the active principles of the thyroid, which in the main corroborate those of Baumann. He finds that the thyroid contains two proteids, viz., a nucleo-albumin and a colloid matter; the former is small, the latter large in amount. The colloid contains a small amount of phosphorus and a considerable proportion of iodine. On gastric digestion it splits up into a non-proteid and a proteid portion, both of which contain iodine, but chiefly the non-proteid portion.

The colloid matter is the only active constituent of the gland in a specific sense. Both the non-proteid and the proteid portions of the colloid are active, but the former (apparently identical with Baumann's iodothyryne) is much more so than the latter.

The Adrenals. With the exception of Tizzoni's¹⁶ notable experimental investigations, from which he concludes that the adrenals are functionless and derive their importance from their anatomical relation to the sympathetic, all modern work strongly indicates that they are functionally active glands.

The theories advanced in regard to the nature of their function are:

1. That their office is to neutralize or destroy certain toxins and effete blood-pigments which are constantly accumulating in the blood; that their function is excretory.

2. That their function is a secretory one; that they elaborate some

substance which enters the circulation and which is necessary to the economy.

Excretory theory. The excretory theory is based largely upon the apparent toxicity of the blood of animals deprived of their adrenals;¹⁷ upon the respective effects of injections, into the peritoneal cavities of rabbits, of solutions of nicotine which had been kept in contact for varying periods with fresh adrenal tissue, and solutions of nicotine of the same strength with or without contact with muscular or renal tissue (Charrin and Langlois¹⁸); upon the effects of atropine upon completely acapsulated animals (Abelous¹⁹); and finally upon the results obtained in guinea-pigs, normal and monacapsulated, by the injections of both sterilized and virulent cultures of the bacillus pyocyaneus (Langlois and Charrin²⁰).

The conclusions of these observers are that the functions of the adrenals are to produce one or more substances designed to neutralize or destroy the toxins normally arising from muscular metabolism, and, perhaps, also certain poisons accidentally introduced from without, including those of bacterial origin.

Secretory theory. The secretory theory is based upon the physiological effects obtained experimentally by subcutaneous and intravenous injections of extracts of the adrenals.

Cybulski,²¹ from an extended series of experiments, concludes that the adrenals furnish an indispensable secretion which diffuses continuously from the glandular parenchyma, more especially of the medullary substance, into the blood-current, its office being to maintain the activity of the vasomotor centres, the vagi and accelerator nerves, the respiratory centre, and with great probability, also, the centre which maintains muscular tonus.

He claims that the active principle can be extracted by alcohol or glycerin and a variety of other solvents, that it is not destroyed by boiling, and will dialize. If the gland is boiled previous to extraction, it will not yield its active substance to water; or if it be dried at a temperature of 110° C., the alcoholic extract is inert and the watery very much weakened. When introduced into the veins of an animal it causes a marked but very brief increase in blood-pressure and a slowing and increase in force of the heart-action, with diminished respiratory efforts. This effect is never obtained from similar preparations from the brain, spinal ganglia, lymph-glands, liver, spleen, kidney, testicle, or thyroid of the calf and ox.

By an independent series of investigations Schaefer and Oliver²² have arrived at essentially the same results. Aside from some disagreement in a few particulars relating to the method of extraction and chemical peculiarities of the active agent, they differ from Cybulski chiefly in holding that the action is exercised directly upon the muscles, and not

through the intervention of the nervous system. They reject the theory that the brief effect and rapid disappearance are due to oxidation, and suggest that the substance may be stored up in the skeletal muscles, and lay particular stress upon the exceedingly minute dosage which suffices to produce the vascular phenomena which they found so prominent.

They agree with Cybulski in localizing the active principle to the medullary portion of the gland.

They conclude from their investigations that the suprarenal capsules are secreting glands which elaborate a material producing striking physiological effects upon the muscular tissue generally, and especially upon the heart and arteries, and that, therefore, one of the main functions, if not the *main* function, is to produce a material which is added in some way or another to the blood, the effect of which is to assist, by its direct action upon the various kinds of muscular tissue, in maintaining that amount of tonic contraction which appears to be essential to the physiological activity of the tissue.

Some very recent work indicates the presence in the adrenals of more than one active principle, and two theories attract our attention :

Mühlmann¹² believes that he has demonstrated the presence of a combination of pyrocatechin in the medullary substance. According to his hypothesis, it is one of the functions of the suprarenal capsules to convert the protocatechuic acid derived from the vegetable elements of diet into pyrocatechin. The latter substance in small doses elevates blood-pressure, while in larger doses it is toxic. The herbivora are less sensitive to its influence, probably as an effect of habituation. Its elimination or conversion into harmless products is believed to be accomplished through the intervention of some unknown activity of the ganglion-cells of the sympathetic. If the latter function fail or the pyrocatechin be produced in excess, toxic symptoms arise, accompanied by an abnormal pigmentation derived from the reaction between the tissues and this substance in the presence of alkalies. The author does not exclude the presence of other active principles and other functions of the gland, but considers his hypothesis to afford the best explanation of the toxic effect of adrenal extracts and the occurrence of pigmentation of adrenal origin.

Gourfein¹ and subsequently Dubois²⁵ have endeavored to isolate the various active principles obtainable from the suprarenal gland.

Without entering into the complex details of their chemical experiments, it is sufficient to state that Dubois has separated the active principles into two classes. The first is composed of several albumoses which may be precipitated with alcohol and redissolved in water. The substances so isolated have no well-marked toxic effect, but they and they alone seem to possess therapeutic importance, manifested by their influence in diminishing or even preventing the results of the injection of muscle-toxins. He regards these antitoxins as diastases or substances

endowed with an inherent dynamic activity which cannot be isolated from the protoplasmic bodies with which it is associated. The second class is composed of bodies which resemble in their constitution and reactions the alkaloids. They have a marked degree of toxic effect, and are identical in some of their reactions with the muscle-toxins. This leads the author to favor the theory that the suprarenal bodies, like the liver, occlude the products of organic waste and modify them *in loco* by the action of special diastases.

Dubois concludes that the chief function of the suprarenal capsules is to destroy the toxins in circulation, especially those resulting from muscular waste and perhaps those furnished by the nervous tissue; that they do not seem to secrete any special substance destined to enter the general circulation, but that their cellular protoplasm possesses a special diastatic property, non-toxic, which seems to modify certain poisons, organic and bacterial, yet this action requires time, and proceeds little by little; that in normal conditions there are always alkaloids present, especially in the medullary zone, which possess an intense toxic action upon both striped and unstriped muscular fibre, and upon certain nervous elements not yet fully defined; that it is the retention of these excrementitious products which brings about serious symptoms; that their quantity may vary under the influence of numerous conditions; and that no positive therapeutic results can be obtained until we are able to separate definitely and completely the toxic and the antitoxic principles which coexist in the suprarenal capsules, as glycogen and its ferment coexist in the liver.

On the basis that the adrenals are functionally active, the employment of adrenal preparations has been advocated in pathological conditions necessarily attended with loss of function of these glands.

I have been able to collect forty-eight cases of Addison's disease treated with various adrenal preparations. They have been tabulated with brief notes of their salient points. Six patients are reported as cured or practically well, 22 improved, 18 unimproved, and in 2 instances an aggravation of the symptoms is stated to have occurred during treatment.

Among the six recoveries, in one instance the patient has remained well for four months; in a second case the treatment was continued for four and one-half months, the pigmentation disappeared, and the patient was able to return to work. He is still under observation one year and a half after the treatment was instituted, and is still well. In a third case the patient was practically well at the date of the last report, twelve months after the beginning of treatment.

In the cases in which improvement was noted relapse and death occurred in one; in another the improvement was only temporary, death following; in a third case, the treatment was irregular, and the patient was relapsing at the date of the last report. In a fourth case

improvement in the asthenia and pigmentation was observed until the end of the fourth week, when, the appetite failing, treatment was suspended, and death occurred two weeks later. In another patient there was marked improvement during regular treatment. During the subsequent months the treatment was irregularly pursued, and eight months later the patient was reported as failing rapidly. In Bramwell's case there was remarkable improvement for a year, the patient being able to resume his ordinary occupation, when death occurred. In still another case improvement had been maintained for twenty months at the date of last report. The patient had been able to return to work, but relapses occurred when the treatment was suspended. Finally, in one case there was improvement for three months, when the patient died quite suddenly on the discontinuance of the treatment.

In many of the cases related the association of adrenal disease with grave tuberculous lesions elsewhere in the body precluded the possibility of obtaining more than an amelioration of symptoms; nevertheless, the results secured justify the hope that perhaps with the isolation and differentiation of the several active principles, if several there be, of the glandular structures, an efficient therapeutics may be obtained for the simple atrophies and fibroid degenerations of the adrenals, which it has been demonstrated may be both localized and provocative of some of the phenomena of so-called Addison's disease.

The rise of blood-pressure produced by the active principle of the adrenals, through its action either directly or indirectly upon the muscular walls of the bloodvessels and the heart-muscle, has suggested the possible therapeutic value of the adrenal preparations in pathological conditions other than those necessarily attended with loss of function of the gland.

Where the vasomotor tone is lowered, as in asthenia and anemia, their use would seem to be indicated, and Oliver²⁶ claims benefit has been noted. In cyclic albuminuria he also states that he has obtained good results from their employment. Oliver also suggests their probable value in heart-failure, as there seems to be some resemblance between the physiological action of the active principle and that of digitalis. In a few cases of this kind adrenal extract has very recently been tried in my hospital wards, and with apparent benefit. The rapid rise in blood-pressure was distinctly shown by the sphygmograph, and was also appreciable to the finger. Further study is necessary to determine their true therapeutic value in the conditions mentioned.

Schaefer and Oliver's investigations indicate that the active principle is not unfavorably influenced by gastric digestion; hence that the various preparations properly may be administered by the mouth, and again, that comparatively large doses may be given to man with safety. A daily dosage equivalent to 45 grains of the fresh gland is recommended

for therapeutic use. It can be given continuously for very long periods without injurious effect.

Thymus Gland. The determination of the true physiological position of the thymus gland in the human economy is especially difficult on account of the several histological phases in its natural history.

Closely related to the thyroid gland in its manner of origin, the structure of glandular epithelium of the first four months of intrauterine life gradually gives place to a lymphadenoid structure which reaches its maximum development at birth. This lymphadenoid thymus is normally present until the period of puberty, when it is gradually replaced by the lobulated fatty thymus, which persists indefinitely in man.

It would, therefore, seem that the existence of a secretory function is presumable only in the first months of intrauterine life. Whether the function of the lymphadenoid thymus differs from that of other lymphadenoid structures yet remains to be determined. The discovery by Baumann of minute amounts of an iodine-bearing compound in its tissues,²⁷ a substance not found in other organs, with the exception of the thyroid gland, is suggestive.

It is thus evident that the physiological basis for the therapeutic use of thymus gland is a slender one.

Clinically, the original employment was accidental, and explanations of its action at present must be regarded as largely speculative.

Owen's published case of exophthalmic goitre,²⁸ in which benefit was observed from feeding with thymus gland which had been used by mistake for thyroid, introduced the thymus treatment of this disease.

I have collected 62 cases of exophthalmic goitre treated by this method. In 36 cases improvement of varying degree occurred; in 25 there was no improvement, and in 1 there was an aggravation of symptoms, resembling in all respects that commonly caused by thyroid feeding in this disease. In one of the unimproved cases a combination of thymus and thyroid was employed at first, and later the thymus alone was given until a few days before death.

In the cases of improvement the effect upon the more characteristic symptoms was as follows:

Exophthalmos: the exophthalmos disappeared in 8 cases; in 1 it nearly disappeared; in 8 it was diminished in amount; in 1 it is stated that the patient was practically cured; in 6 the symptom is not mentioned; and in 12 there was no effect.

Goitre: in 4 cases a slight enlargement of the thyroid gland disappeared; in 12 the size was reduced; in 13 there was no effect; in 7 the goitre is not mentioned.

Pulse-rate: in 17 cases the pulse-rate was reduced; in 3 of these the reduction was very slight. In 13 cases there was no diminution in the frequency of the pulse; in 6 cases the symptom is not mentioned.

In a large proportion of the 36 cases it is evident that there was an improvement in the subjective sensations, and in many in the general condition, including a gain in weight. In the remaining 26 of the 62 cases either no beneficial effect was observed or an aggravation of symptoms occurred.

It is desirable to compare the favorable results which have been described with those obtained by other methods of treatment.

McKenzie¹ has carefully contrasted twenty cases of exophthalmic goitre personally treated by him with thymus preparations, either alone or combined with other remedies, with a similar number also personally treated by other methods. As regards the pulse-rate, "there was nothing in favor of the thymus treatment." The goitre became materially smaller in three cases under thymus treatment; in two it increased, and in another it increased after first diminishing. In the remaining cases it remained practically unchanged.

In the *contrast*-cases the goitre diminished in four; in a fifth it entirely disappeared; in one case it increased; in the remainder no change was observed. Under the *thymus* treatment proptosis decreased distinctly in only one case, and in this instance a reduction had begun before the thymus was given. In the *contrast*-cases the exophthalmos disappeared in three.

McKenzie's conclusions are that the thymus gland possesses no specific action in exophthalmic goitre; that "in most cases it has no effect upon the heart, goitre, or proptosis." At the same time he believes it to be "a remedy of some value, improving the general condition, and in this way assisting toward recovery." He places it in the same class of remedies as cod-liver oil.

In two severe cases carefully observed from day to day in my hospital wards for the past five months, in which the thymus treatment alone was used for two months, and other methods subsequently, the former treatment was without the slightest beneficial effect upon any symptom. In one the thyroid increased by an inch during the thymus period. In contrast, in one of these cases there was marked improvement in the tremor, a diminution in the pulse-rate, a reduction in the goitre of an inch, with improvement in the general condition, accompanying the use of bromides and belladonna, to be followed again by a recrudescence of the symptoms.

Mandy,² in reporting four cases treated with marked benefit with thymus preparations, remarks that he "cannot claim that the rapidity and maintenance of improvement have been more than might occur under other treatment, or none at all."

In judging of the therapeutic value of the thymus treatment in exophthalmic goitre too much reliance should not be placed upon the relative number of published cases of successes and failures. Favor-

able results from a new remedy are more frequently reported than failures.

Finally, in few diseases is it as difficult to speak positively of the value of any particular method of treatment. The natural fluctuations of the disease are great, and improvement and recrudescence occur often in an unexplainable manner.

Goitre. Mikulicz³¹ has reported thirty cases of goitre treated with thymus extracts. In twenty cases the goitre underwent a decided reduction, as ascertained by exact measurements, and subjective improvement followed. Among these are several cases which had only slightly improved or which had become worse under thyroid treatment. A complete cure in the anatomical sense was only obtained in two cases. With the exception of one case (mixed nodular and diffuse parenchymatous) they were all diffuse hyperplastic tumors. Five of the unsuccessful cases were of the nodular, and five of the diffuse hyperplastic form.

The mode of action of the remedy remains a matter of speculation. It is possible that the active principle is an iodine compound, which Baumann was able to isolate in the case of the thymus as well as the thyroid gland.

In view of the possible stimulation of the nutritive processes in exophthalmic goitre by the thymus extracts, it is of interest to study their effects in other diseases attended with impaired nutrition.

With this object in view the treatment was tried in my hospital wards during the past winter in six carefully selected cases of apyretic pulmonary phthisis.

The general condition, weight, and physical signs of the patients were carefully noted for a period before the institution of the thymus treatment. The extract in daily doses of 45 grains, speedily increased to a drachm, was then given continuously for two months, when the usual treatment of the hospital—creosote, the malt preparations, and cod-liver oil—was resumed.

In Case I. (infiltration of one apex) the weight, which had been nearly stationary, increased two pounds during the first three weeks of treatment; there was a loss of six pounds during the subsequent five weeks, when the usual treatment was resumed.

In Cases II. and III. (consolidation at one and at both apices respectively) the weight was stationary prior to treatment. There was a gain of four pounds in each case during the first three weeks, and then a loss of eight pounds in one case and two pounds in the second case in the subsequent five weeks. In the following two months, under ordinary treatment, in the case showing the greatest loss, there was a gain of two pounds; in the other there was no gain.

In Case IV. (consolidation at both apices) there was a gain of two and one-half pounds in the first two months, and then a loss of three

and one-half pounds in the succeeding two months under other treatment.

In Case V. (infiltration at one apex) a gain of seven pounds in three weeks was followed by a loss of four in the succeeding five weeks, which was again followed by a gain of two pounds in the seven weeks subsequent to the discontinuance of the thymus.

Finally, in Case VI. (consolidation at both apices) there was a gain of a pound in the first week, and a continuous loss, amounting to eight pounds, from this time until other treatment was substituted for the thymus. In five of the six cases it is seen that an increase in weight occurred during the first weeks of treatment. The gain was followed by a loss, varying in amount. In only one case was there no loss in weight during the two months of the thymus treatment.

In all the cases there was little or no change in the general condition and physical signs during the thymus treatment, although at first, as is so often the case with the trial of a new remedy with the knowledge of the patient, expression of improvement in subjective sensations was made.

Whether the favorable response in the first weeks to the remedy, as shown in improved nutrition, may not be referred to the stimulus of hope, permits of speculation.

Pituitary Body. As in the case of the glandular structures already considered, the function of the pituitary body is variously believed to be of a secretory or excretory nature.

Schaefer and Oliver's³² experimental investigations with decoctions of its tissue indicate that its activity is of a secretory character.

Rapid and great rise of blood-pressure was observed, and it was shown that the action of the active principle was a direct one upon the arterioles and probably so upon the heart-muscles. They conclude from their results that the pituitary body furnishes a secretion to the blood which serves to increase the contractile power of the heart and arteries and to influence the nutrition of certain tissues.

On the other hand, very slight physiological effects, beyond a slight elevation of temperature, slight depression, and some gastro-intestinal disturbance accompanied by emaciation, were noted by Mairé and Bose in their experimental work.³³

Marie,⁴ who first described the disease acromegaly, regarded by many as dependent upon pathological changes in the pituitary body, believes that the function of the gland is to neutralize or destroy certain toxins whose accumulation in the blood provokes a hyperplasia of connective tissue, including the bony structures.

On the basis of a presumable glandular activity, the use of preparations of the pituitary body has been suggested in acromegaly.

With few exceptions autopsies in cases of this disease have shown

macroscopic lesions of the pituitary; they have consisted chiefly in simple hyperplasias of its structures or of tumors of various kinds with or without apparent change in the volume of its glandular tissue. Tamburini³⁵ has recently collected twenty-four autopsies in which tumor existed in seventeen, and of the remaining seven he considers the diagnosis of acromegaly to be doubtful in five. In the case of either lesion it is presumable that the function of the gland is affected. Both diminished secretion and hypersecretion have been suggested in explanation of the evolution of the symptoms of acromegaly. Clinical as well as pathological observations may be urged with equal force in favor or in disproof of either of these theories. From the standpoint of pathological anatomy, it may be said that while destructive lesions are the exception, they do occur; and in cases of tumor the absolute volume of the proper tissue of the gland, whether increased or diminished, affords no reliable indication of its functional activity. Experimental reduction of the volume of glandular tissue (Gley³⁶) fails to support the theory of secretory failure.

Clinically, in a few cases the administration of pituitary extract has been found to relieve certain of the characteristic symptoms, a result which does not harmonize with the hypersecretion theory; and yet such a result is not necessarily incompatible with it. Still less does it negative the possibility of a hyperactivity of one element in a composite function, the product of which may not be present in the preparation as actually administered.

Marinesco has advanced the hypothesis that some perversion occurs in the composition of the secretion, or that some lack of balance arises between it and the products of the other ductless glands, as a result of which nervous control over the nutritive processes is impaired. In this way provision is made for including both the hypertrophic and the atrophic lesions of the gland.³⁷

The idea of a correlated activity of several of the glands jointly influencing nutrition either directly or through the medium of the nervous system, is sufficiently elastic to cover almost any combination of circumstances; but it must be remembered that it is as yet an unproved hypothesis.

Arnold,³⁸ Dreschfeld,³⁹ and Dercum⁴⁰ go one step further and favor a primary nervous lesion of unknown character, thus reducing the glandular changes to phenomena of the second order.

In conclusion, it may be said that while the whole subject presents an accumulation of theories having an exceedingly slender support on definite findings, it is probable that the pituitary gland bears some unascertained relation to the nutrition of bony and dermal tissues, as a result of which an overgrowth of them accompanies changes in the

gland which presumably affect its functions. Whether these changes are primary is as yet unknown.

A few cases have been reported which indicate a widespread involvement of the glands of internal secretion and suggest a possible common origin. Murray¹¹ has collected five cases of this kind; in all acromegaly and exophthalmic goitre coexisted, and in four glycosuria also was present, pointing, perhaps, to some perversion of the pancreatic secretion. In the two cases with fatal issue the thyroid and pituitary glands were enlarged, and in one of these the thymus was persistent and hypertrophied.

I have collected thirteen cases of acromegaly treated with pituitary preparations. In seven cases varying degrees of improvement were noted. In one of these the improvement occurred under the combined use of pituitary and thyroid preparations. In five cases no effect was obtained; and in one case the patient was made worse by the treatment.

In two cases of improvement the violent headache and neuralgic pains in the limbs were diminished, and the general condition otherwise improved. There was no diminution in the size of the affected tissues.

In a third case the general condition was improved; no painful symptoms had been present at any time.

In a fourth case, after fourteen days of treatment the patient was able to approximate the teeth better than before, and the patellar reflex on the left side, which had been absent, was restored. Under treatment with thyroid extract for several months previously no improvement had occurred.

In a fifth case it is stated that the patient had greatly improved under treatment.

In a sixth case the patient was treated for two months with thyroid preparations, then for three to four months with pituitary extract, and finally for one and one-half months with combined pituitary and thyroid preparations. The final result was a decided decrease in the measurements of the extremities, an almost complete disappearance of the neuralgic pains, and an improvement in the general condition.

Finally, in the seventh case, there was an improvement in the mental condition.

A tabulated report of these cases is appended.

ADRENAL PREPARATIONS IN ADDISON'S DISEASE.

Observer.	No. of cases.	Results.	Remarks.
Blackader, A. D., Montreal Med. Journ., Nov. 1893, and results from personal letter.	1	Distinct im- provement.	Under treatment four weeks; energy and power of endurance greater; bronzing of skin less marked.
Chauffard, La Semaine Méd., 1894, p. 71.	1	Not im- proved.	
Abelous, Langlois, and Charrin, Arch. de Physiol., 1892, p. 721.	1	Not im- proved.	Patient profoundly tuberculous; death followed in a short time.
Sée (Germain), quoted by Abelous, Langlois & Charrin, Arch. de Physiol., 1892, p. 721.	1	Not im- proved.	Death shortly after from general tuberculosis.
Langlois, Bra. Methode Brown-Séquard, p. 596. Presse Méd., 1896, p. 1181.	1	Improvem't in asthenia.	Passed out of observation at end of one month.
	1	Not im- proved.	Patient soon declined to be treated on account of pain at seat of the injections.
Lloyd-Jones, Brit. Med. Journ., 1895, ii. 483.	1	Improved.	
Francis, Brit. Med. Journ., 1896, i. 1088.	1	General im- provement; cutaneous pigmentation lessened; pigment in mouth un- changed.	Improvement continued for several months, followed by relapse and death.
Dyson, Quart. Med. Journ., 1894, iii. 43.	1	Not im- proved.	Very advanced case.
Sansom, Brit. Med. Journ., 1895, ii. 1235.	1	Improved.	"Subjective symptoms improved wonderfully." Treat- ment was irregular, and at date of report patient was relapsing.
Althaus, Brit. Med. Journ., 1895, ii. 1235.	1	Improved.	Improvement only temporary, followed by death.
Stockton, Med. News, 1895, lxvii. 551.	1	Cured.	Pigmentation almost removed, and general condition practically restored to normal.
Murrell, Lond. Lancet, 1896, i. 289 (also Parkin- son, Brit. Med. Journ., 1896, i. 150).	1	Not im- proved.	Asthenia and pigmentation three months; under treatment for the following six weeks, at the end of which death occurred.
Shoemaker, Univ. Med. Mag., Feb. 1895, p. 309.	1	Improved.	Subcutaneous injections of glycerin extract for two months. Subjective symptoms restored to normal, pigmentation about as before.
Turney, Brit. Med. Journ., 1896, i. 150.	2	Not im- proved.	Very advanced cases. One patient lived only two days; the other only two weeks.
Oliver (Thomas), Internat. Clinic, 1894, ii. 23.	1	Not im- proved.	
Ringer and Phear. Clin. Soc. Trans., xxix. 68.	1	Improved.	Asthenia and pigmentation improved until the end of the fourth week, when the appetite failed, and treat- ment was suspended. The patient died two weeks later.

Observer.	No. of cases.	Results.	Remarks.
Tonoli, Gaz. Med. Lomb., xiv, 321.	1	Cured.	Treatment with powdered adrenal tissue for two months.
Shattuck, report by Cabot, Med. News, 1896, lxix, 281.	1	Apparently well.	Has remained apparently well for four months.
Stewart, T. G., rep. by Duckworth, 20th Cent. Pract., ii, 21.	1	Not improved.	
Spillmann, Rev. Med. d. l'Est., 1896, xxviii, 41. Rev. des Sci. Med., 1896, xlviii, 86.	3	2 not improved. 1 improved.	Subsequently relapsed.
Oser, Internat. Med. Mag., Feb. 1896. Johns Hopkins Bul., 1896, p. 208.	1	Markedly improved.	Gained weight, strength fully restored, pigment has disappeared from palate, but not changed on integument. Eight months after the original report the patient, who has meanwhile been treated without much regularity, is said to be failing rapidly.
	1	Not improved.	Died on the seventh day of treatment.
Oliver (George), Brit. Med. Journ., 1895, ii, 561, 653.	1	Practically well.	Last report at end of twelve months' treatment. This case also reported by Rolleston and by Oliver several times.
	2	Markedly benefited.	One still under treatment at last note, the other lost sight of.
Wood, Univ. Med. Mag., viii, 483.	1 (2 or 3)	Apparently well. (Improvement.)	Immediate improvement in subjective symptoms, after a few months apparently well; bronzing not affected. (Author states that he knows of these cases; no details.)
Stockman, Edin. Med. Journ., Feb. 1897, p. 211.	2	1 no improvement. 1 improved.	Improvement had lasted twenty months at date of report. Patient is able to follow his ordinary occupation, but relapses occur when treatment is suspended.
Maragliano, Riforma Med., 1894, iv, 650.	1	Improvement.	Subjective improvement and increase in muscular strength. Able to walk after the tenth injection (twenty days), although previously bed-ridden.
Pitres, Cong. de Med. Int. Bordeaux, 1895.	2	Worse.	Injections caused severe local irritation and aggravation of symptoms.
Faisans, personal com. to Dupaigne, These de Paris, 1896.	1	Improved.	Pigmentation improved, other symptoms persisted.
Dupaigne, These de Paris, 1896, pp. 169, 118.	2	1 no improvement. 1 improved markedly.	An advanced tuberculous case.
Epsbaum, These de Paris, 1894.	2	1 improved.	Under treatment only a short time, and subsequently lost sight of; improvement very marked from two weeks' treatment.
	1	1 improved.	After two months of treatment was able to return to work.
Duchefoy, Dupaigne, These de Paris, 1896, p. 131	1	Improved.	Improved only while under treatment; relapsed promptly each time it was suspended.
Bechere, Dupaigne, These de Paris, 1896, p. 131.	1	Cure.	Treated with ingestion of fresh gland for one month, and then for three and a half months with subcutaneous injections of extract. Pigmentation disappeared and patient was able to work. Cure had continued one year and a half at date of report, patient remaining under observation.

Observer.	No. of cases.	Results.	Remarks.
Marie, Dupaigne, Thèse de Paris, 1896, p. 136.	1	Improved.	Asthenia less marked.
Bramwell, Brit. Med. Journ., 1897, i. 67.	1	Marked improvement.	Improvement lasted for a year, when death occurred. Asthenia improved so that patient shortly before his death was able to walk eight miles.
Quine, Journ. Amer. Med. Ass., 1896, xxvi. 1012.	1	No improvement.	Treatment only continued twelve days; patient died four days later.
Darier, Ann. de Derm. et d. Syph., 1895, p. 464. See also for termination, Dupaigne, loc. cit. p. 102.	1	No change.	Treatment suspended on fifteenth day on account of local abscess. He died soon after.
Schilling, Münch. med. Woch., 1897, p. 170.	1	Improved.	Three months' treatment; weight rose from 69-99 lbs. Strength fully restored, bronzing markedly diminished. Died three months later with toxæmic symptoms.
Kinnicutt (unpublished case).	1	No effect.	Treatment initiated only with the development of toxic symptoms. Death five days later. Diagnosis confirmed by autopsy; general tuberculosis, tuberculous and fibroid changes in adrenals.

THYMUS THERAPY IN EXOPHTHALMIC GOITRE.

Observer.	No. of cases.	Results.
Owen (Brit. Med. Journ., 1896, vol. ii. p. 1017)	3	Improved.
Williams (Clinical Journ., vol. vii. p. 93)	1	Worse.
Cunningham (Med. Record, vol. xlvii. p. 742)	3	Improved.
Taly-Guerin (Sem. Méd., 1895, p. 331)	1	Not improved.
Solis-Cohen (Philadelphia Polyclinic, 1896, vol. v. p. 446)	4	Improved.
Dreschfeld (Practitioner, 1896, vol. lvii. p. 154)	3	Not improved.
Todd (Brit. Med. Journ., 1896, vol. ii. p. 195)	1	Improved.
Maude (Lancet, 1896, vol. ii. p. 173)	4	Improved.
McKee (Brit. Med. Journ., 1896, vol. i. p. 656)	1	Improved.
Edes (Boston Med. and Surg. Journ., 1896, vol. cxxxiv. p. 82)	1	Improved.
Mikuliez (Centrbl. f. Chir., 1896, p. 929)	8	1 improved. 7 not improved.
Parker (Brit. Med. Journ., 1897, vol. i. p. 528)	1	Improved.
Lockie (Brit. Med. Journ., 1897, vol. i. p. 529)	2	Improved.
Sutcliff (Brit. Med. Journ., 1897, vol. i. p. 782)	1	Improved.
Metcalf (rep. by Mackenzie, AMER. JOURN. MED. SCI., 1897, 132)	2	Improved.
Mackenzie (AMER. JOURN. MED. SCI., 1897, p. 132)	20	13 improved. 7 not improved.
Booth, J. A. (personal communication)	4	Not improved.
Kinnicutt	2	Not improved.

PITUITARY TREATMENT OF ACROMEGALY.

Observer	No. of cases.	Results.	Remarks.
Barl, Lyon Med., 1892, lxix, 547.	1	No result.	Pituitary extract from rabbit used subcutaneously. Author proposed to continue the treatment with extract derived from ox and sheep, but no further report can be found.
Marinesco, Bull. et Mem. Soc. Med. des Hôp., 1895, p. 715.	2	Very much improved.	The violent headache and neuralgic pains in the limbs considerably reduced, and the general condition otherwise rendered more satisfactory. No diminution in size of diseased parts. Marked diuresis. Author believes that the treatment exercised an effect either on the pituitary tumor or the cerebral circulation.
	1	Slight improvement.	General condition improved. This patient did not present any painful symptoms.
Mendel, Berl. klin. Woch., 1895, 1129.	1	Improved.	After fourteen days' treatment patient was able to approximate the teeth better than before, and the patellar reflex on the left side, which had been absent, was restored. This case had been treated for several months with thyroid extract without improvement.
Bramwell, Brit. Med. Journ., 1891, i, 21.	1	Improved greatly.	Author states that improvement may have been due to favorable general conditions during hospital residence. Previous treatment with thyroid had failed in this case.
	1	No effect.	Subsequently improved under thyroid.
Thomas, Brit. Med. Journ., 1896, i, 909.	1	No effect.	Refused to continue treatment because it made her "feel queer." Subsequently relieved by trephining.
Dinke, N. Y. Med. Record, 1896, i, 779	1	Marked improvement.	Treatment for two months with thyroid, then for three to four months with pituitary, and finally for one month and a half with thyroid and pituitary combined. The final result was a decided decrease in the measurements of the extremities; pains had almost disappeared, and the general condition was improved. Patient believes that the improvement was due to the thyroid.
Osler, Prin. and Pract. of Med., (1895) p. 1017	1	Not improved.	
Broadbent, Dodge- son, Lancet, 1896, i, 846.	1	Some improvement.	Chiefly in the mental condition; possibly due to the relief of the obstinate constipation.
Rolleston, Lancet, 1896, i, 1137.	1	No improve- ment.	Measurements increased. Author attributes the relief in pains and diminution of glycosuria to rest and diet.
Schulze, Berl. klin. Woch., 1896, p. 407.	1	Worse.	Caused irregularity of heart-action, and death followed.

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AN ANATOMICAL AND BACTERIOLOGICAL STUDY OF ACUTE DIFFUSE NEPHRITIS.

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THE kidney is a glandular organ, but there is no gland in the body with which it may be compared. The peculiarity in the structure of the kidney lies in its blood-supply and in its structure as a gland. There is in the kidney a structure corresponding to a gland, and leading from this an excretory duct which also has true glandular properties of its own, so that the kidney may be considered as a double glandular organ. The glomeruli have the structure of true glands, with capillary wall, basement-membrane, and differentiated epithelium. The tubule leading from the glomerulus may be considered partly as an excretory duct for that glandular structure, but it has glandular functions of its own as well, and adds various substances to the secretions of the glomerulus. The circulation of the kidney is peculiar in that nearly all of the blood passes first to the glomerulus, and after circulating in the capillaries of this leaves the glomerulus in a single vessel, which again breaks

up into capillaries which are distributed between the tubules. From this it can be seen that any lesions of the glomerulus which in any way interfere with the circulation of the blood in its vessels must exert a marked action on the nutrition and function of the other parts. The glomeruli, tubules, and vessels are held together by delicate interstitial tissue in which there are but few cells. It is only around the larger arteries and veins near the pyramids that connective tissue is in any amount, and in this there are considerable numbers of round cells, which may increase in number in almost all pathological conditions.

There is considerable power of regeneration in the kidney, which becomes less the older the individual. In the normal kidney, not only portions of epithelial cells which are destroyed in the ordinary process of wear and tear form again from the old, but new cells are formed. It is not probable that in the adult kidney portions which are wholly destroyed can be regenerated. Certainly no evidence of such regeneration is seen around the tissue destroyed by an infarction. Hypertrophy of the remaining glomeruli can be seen in kidneys in which there has been extensive destruction, and the same thing is probably true of the tubules.

In order that the kidney may preserve its normal structure and function a number of conditions are necessary. The blood must enter the kidney in the proper manner and under the normal pressure. The circulation of the blood in the kidney must not be impaired. There must be no impediment to the venous outflow. The small veins in the kidney are numerous, the blood-pressure within them is low, and central or local circulatory disturbances easily produce passive congestion. Degenerative lesions of the epithelium are produced not only by the retained venous blood, but the direct pressure exerted on the cells by the enlarged vessels probably has some effect. Free exit must be given to the products of secretion. The ureter has thin walls; it pursues a long course, and is little protected from pressure. There is a series of pathological conditions in the urinary tract which can increase the pressure within the tubules, and this leads to alterations of structure. The character of the blood coming to the kidney must be normal. The blood may contain substances which are directly injurious to the kidney and affect its tissues in various ways.

The diseases of the kidney due to alterations in the character of the blood are the most numerous and the most serious, and their pathology is the most obscure. In a consideration of the lesions so produced it is obvious that we can divide them into classes dependent in part upon the nature of the injurious substance. These substances may be divided into those which are soluble and those which are insoluble. Insoluble substances too large to pass through the capillaries may lodge in some of the vessels of the kidney, and produce lesions in the tissue immediately

around them. All of the lesions produced by insoluble substances are focal in character. Inert substances produce effects solely by cutting off the circulation of circumscribed portions of the tissue, as is shown by the infarction. Infectious substances contain or are composed of bacteria, which, by their growth, are capable of increasing their effects. It is possible to have infected emboli act both mechanically and by infecting the tissue. It is obvious that the bacteria can only enter into the kidney tissue by the bloodvessels or by the urinary passages, and it is frequently difficult to determine from the character of the lesion whether they have entered in either of these ways. If by the blood, they can easily make their way by growth into the tubules, and can be found there, or *vice versa*.

The chief difficulty in the study and classification of diseases of the kidney is found in those which are due to the action of soluble injurious substances; these soluble substances being carried to all parts of the kidney by the blood, produce diffuse lesions, which may be more marked in certain parts of the organ. It may be that the substances act in a special manner on certain histological elements of the kidney, or it may be that in certain parts of the kidney there is diminished resistance to their action due to causes for the most part unknown. Both classes of lesions, the focal and diffuse, may be found in the same kidney. In cases of severe staphylococcus infection focal lesions may be met with around emboli or thrombi of bacteria, and in addition there may be diffuse lesions which are due to the presence in the blood of soluble chemical substances which are produced by the bacteria either in some other focus or in the kidney. In certain of the infectious diseases, notably in diphtheria and typhoid fever, focal lesions in various organs, as in the liver, spleen, and lymph-glands, and to a less degree in the kidney, may be produced by the influence of soluble chemical substances produced by the disease. So that it is impossible to draw an absolutely sharp line between the etiology of the focal and the diffuse lesions of the kidney.

Bright, to whom we owe the first attempt to classify the diseases of the kidney, regarded those pathological conditions associated with albuminuria as representing three stages of the same disease, and as inflammatory in character. Rayer, in 1840, divided the lesions described by Bright into six different forms, and separated the albuminuria, due to venous hyperæmia, from the essential diseases of the kidney. He regarded the process as inflammatory in character. Reinhardt, in 1850, was the first to make a careful histological study of the lesions of the kidney, using the more improved histological methods available at that time. He considered that the different conditions found in the kidney represented different stages of one and the same disease, the small, shrunken granular kidney being the last stage in the process. Frerichs, in 1851, con-

cluded with Reinhardt that the pathological processes in the kidney represented a single disease, and differences in the anatomical appearances were due to different stages of the process. This view as to the unity of the diffuse pathological processes of the kidney was opposed in England by Wilkes in 1850, and in Germany by Bartels in 1875. Wilkes concluded from clinical observations that the large, swollen white kidney did not pass into the small hard; that the lesions in the two conditions were absolutely different, and due to different causes. Bartels calls special attention to the differences in the clinical course of the disease marked by the large white kidney, as distinguished from the small red; dropsy being a prominent feature in the first, and usually absent in the last. Virchow's work on inflammation, in 1852, served to direct observation to the part played by the epithelial constituents, and he introduced the term parenchymatous nephritis to designate those cases in which lesions of the parenchyma are of chief importance. Baer, 1859, described the connective tissue of the kidney. He recognized its presence not only in the pyramids, but in the cortex, and introduced the term "interstitial nephritis" to describe that form of disease in which the lesions are chiefly found in the interstitial tissues. The diseases of the bloodvessels of the kidney were studied by Zeigler, 1879, who recognized a special form of disease—arteriosclerotic nephritis—due to these vascular lesions. Charcot, 1878, partly from clinical, partly from pathological anatomical observations, distinguishes three different forms of nephritis. The first is characterized clinically by a rapid course and diminution in the amount of urine, a large amount of albumin and dropsy, and anatomically by a large white kidney. The second clinically by a chronic course, increase in secretion of urine, a small amount of albumin, and anatomically by the small red, contracted kidney. The third form is the amyloid kidney. Weigert, 1879, published a celebrated article on nephritis in which he separated the diseases of the kidney into those which were solely degenerative and those which were inflammatory. In this article he denies the possibility of inflammatory lesions confined to the parenchyma or to the interstitial tissue. There may be degenerative lesions of the kidney of so slight a character that they do not cause either exudation from the vessels or proliferation of the connective tissue, but interstitial changes are always accompanied and preceded by lesions of the parenchyma. For him the whole process which was regarded as Bright's disease was a diffuse nephritis, in which he distinguished different forms.

The views of Weigert have been accepted by most of the German clinicians. It is the general habit now to speak of these diffuse renal lesions as Bright's disease, the term being used with more or less ambiguity. The term "nephritis" is also applied to the process.

For the present the classification of the diffuse lesions of the kidney

must be founded on the character of the anatomical lesions. A classification on an etiological basis is the most scientific and the simplest, but we know little or nothing of the etiology of these diseases. Various forms of disease in other organs, particularly of the heart, are often found associated with them. Bacteriological investigation has shown in many cases the presence of certain organisms in the kidney. In most cases the bacteria are found in some other lesions and in the blood, and their presence in the kidney is but a part of a general septicæmia. Moreover, the same condition in the kidney may be associated with a variety of organisms, and the same organism may be associated with widely different anatomical lesions. Nor is there anything in these lesions to show that they are produced by the direct action of bacteria on the tissues. From the diffuseness of the lesions, from their affecting all parts of the kidney, it would seem evident that they must be due to injurious substances in solution in the blood. We know that chemical substances are produced by bacteria, and that their presence in the blood can produce various lesions, mainly degenerative in character, in the kidneys. Morse has shown that the continued injection of the sterile filtrate of virulent cultures of the *staphylococcus aureus* into the blood will produce not only degeneration of the epithelium, but hyperplasia of the interstitial tissue. Although it is probable that the chemical substances produced by the bacteria may play an important rôle in the production of renal disease, their importance may be overestimated. Even when we find renal disease associated with bacterial infection localized elsewhere the relation between the two may be the other way. The renal disease may be the primary condition, and the bacterial infection may be due to some alteration in the character of the blood which renders the tissues more prone to infection. Substances may be produced in the alimentary canal, or by the imperfect action of some one or other organ, which may exert an injurious action on the kidneys. When we speak of these lesions as diffuse, we do not mean that all parts of the kidney are equally affected. The study of the degenerations which occur in the course of infectious diseases and from the action of poisons has shown that in some cases the convoluted tubules are the most affected; in others the collecting tubules or the loops of Henle. All parts of the kidney are, of course, equally exposed to the injurious action of chemical substances, but all may not be equally susceptible. With slight differences in the intensity of the lesions, due to conditions which we do not understand and which may represent an increase or diminution of the local resistance, susceptible tissues will be affected. In the same way, in the more severe lesions of the kidney we find that in some the glomeruli are principally affected; and although these lesions in the glomeruli may be accompanied by lesions chiefly degenerative in the tubular epithelium, these may be, in part or wholly, secondary to

the lesions in the glomeruli. In other cases, again, there are lesions in the connective tissue consisting in active proliferation of the cells contained in this. This acute hyperplasia of the connective tissue, although accompanied by degenerative changes of the epithelium, cannot be considered as primary to such changes. No anatomical classification can be so sharp and definite as one based on etiology. In the anatomical classification there often occur mixed forms. One form may have another grafted on itself, and an acute glomerular affection may be added to a chronic arteriosclerotic change, or to a hydronephrosis. The anatomical classification must be based on the character of the lesions as determined by the histological examination. Although the microscopic lesions are accompanied by more or less definite alteration in the gross appearance of the kidney, yet the connection is not sufficiently definite to enable us to determine by these gross appearances the one form of lesion from the other. From my study of these diffuse lesions of the kidney it has seemed to me that the following classification might be adopted. I include here both the acute and chronic, although this paper has reference only to the more acute lesions. It must be understood that in using the word nephritis we do not necessarily imply that the lesions fall under the rubric of inflammation, but the word is used as signifying simply disease of the kidney. It might possibly be well to substitute for the word nephritis the term "nephropathy," although the objection to this is a complication of an already complicated nomenclature.

I have adopted the following as perhaps the most suitable classification of diffuse nephritis which we can make from an anatomical basis:

ACUTE DIFFUSE NEPHRITIS. (*a*) *Acute degenerative nephritis.* In this are included degenerative lesions of the epithelium, embracing cloudy swelling, hyaline, fatty, and dropsical degeneration, and often complete necrosis, without lesions other than degenerative, in the glomeruli or in the interstitial tissue. This occurs chiefly in infectious diseases, in jaundice, in anemia, and as the result of the action of certain poisons. The kidney is slightly swollen or unchanged in size, rather paler and more opaque on section; the markings may be obscure or more prominent than normal. There is often albuminous exudation in the glomerular capsules and in the tubules.

(*b*) *Acute glomerular nephritis.* The essential changes consist in acute lesions in the glomeruli. There may be acute proliferation of the endothelium of the vascular tufts, hyaline and fibrinous thrombi in the vessels, accumulation of leucocytes in the vessels, degeneration of the vessel-wall, etc. These changes in the vascular tufts of the glomerulus can take place with or without changes in the capsular epithelium. The changes in the capsular epithelium consist in degeneration and proliferation. The capsular space may contain an albuminous hemorrhage or

fibrinous exudation. The changes in the vascular tufts and in the capsule are so frequently combined in various degrees that they cannot be separated into two sub-classes. The glomerular lesions are accompanied by degeneration of the tubular epithelium, necrosis, and exfoliation. Often there are dilatation of the tubules and edema and cellular proliferation of the intertubular tissue. There may be more or less hemorrhage in the tubules.

This affection occurs in infectious diseases, notably in acute endocarditis, measles, and diphtheria, or as an independent affection. The kidney is usually increased in size. The capsule easily strips off; the surface is pinkish and mottled with points of ecchymosis. On section the cortex is wide, rather paler and more opaque, markings obscure; glomeruli pale, enlarged, and prominent. Pyramids often congested. The tissue moist and pits on pressure. While these appearances are usually marked, lesions of the glomeruli may be found with but little macroscopic change in the kidney.

(c) *Acute hemorrhagic nephritis*. The essential change consists in hemorrhage in the tissue combined with degeneration of the epithelium. The hemorrhage is chiefly found in the capsule of the glomeruli and in the tubules. The degenerative lesions may be extensive and lead to necrosis and exfoliation. Edema, hemorrhage, and cellular infiltration are often found in the intertubular tissue. The kidney is enlarged, hemorrhages are found in the capsule; the surface is dark red, with numerous ecchymoses. On section the cortex is swollen and sprinkled with dots and streaks of ecchymosis. Only three cases of this were found in my series.

✓ (d) *Acute interstitial non-suppurative nephritis*. The essential lesion consists in acute proliferation of the cells in the intertubular tissue. The proliferation takes place mainly from the vascular endothelium. The cells lie within and without the vessels. They are large and similar to the endothelial cells of young granulation-tissue. They are found chiefly in the intermediate zone of the kidney between the pyramids and the cortex. In the cortex they are both generally diffused and in areas chiefly around the glomeruli. There is more or less degeneration and necrosis of the tubules, affecting chiefly those in the areas of cellular infiltration. Leucocytes in small numbers may be found in the intertubular tissue among the other cells, in the degenerated epithelium, and in the lumen of the tubules. The glomeruli are not affected. This affection occurs in acute infectious diseases, notably in diphtheria and scarlet fever. The kidney is large, pale, somewhat mottled; on section moist, opaque, markings obscure, and milky fluid can be pressed from it.

SUBACUTE GLOMERULAR NEPHRITIS. The essential lesions are in the glomeruli. They consist in swelling and nuclear increase in the vascular tufts and obliteration of the vessels by hyaline degeneration, both of the cells and the vascular walls. These changes in the tufts are

often combined with proliferation and desquamation of the capsular epithelium with connective-tissue ingrowth. There are extensive degeneration, necrosis, and desquamation of the tubular epithelium. The intertubular tissue is the seat of oedema and connective-tissue formation. There is often a previous history of exposure to cold or of an infectious disease, and it may occur after rheumatism or endocarditis. The kidney is enlarged, the capsule may cling slightly to the surface; the surface is pale or slightly mottled. On section cortex increased in width, pale, opaque, markings obscure, glomeruli pale, consistency increased. There are gradual transitions between this and the acute and chronic glomerular nephritis.

CHRONIC DIFFUSE NEPHRITIS. (*a*) *Chronic glomerular nephritis.* The essential lesions are in the glomeruli. They consist in extensive hyaline degeneration of tufts and of entire glomeruli, and obliteration of capillaries. Every transition may be seen between these glomerular lesions and those in the subacute form. There may be some increase in the capsular epithelium and connective-tissue formation within the capsule. The tubular epithelium shows extensive degeneration and destruction. Entire tubules are destroyed, often being represented by the thickened irregular membrana propria. There is a general and diffuse increase of the connective tissue affecting almost equally all parts of the kidney. This condition is usually found as an independent affection or may be combined with acute infections of various sorts. There is often a history which points to a previous acute or subacute affection. The kidney may be slightly larger than normal, of normal size, or considerably smaller. The capsule is often adherent, the surface even, not granular, pale. On section the cortex varies in width; it may be quite small. It is opaque, whitish, the markings obscure; the glomeruli not visible or pale, and the consistency of the tissue is greatly increased.

(*b*) *Chronic arteriosclerotic nephritis.* The essential lesions are in the arteries and consist in those changes which are known as arteriosclerosis. There is degeneration of the epithelium of the tubules with more or less complete destruction. The degeneration takes place slowly, and at any given time sections may show only a slight degree. Atrophic changes in the epithelium are common. The lesions may affect almost equally all parts of the kidney, or appear in areas corresponding to the distribution of those arteries which are most affected. There is a general increase in the connective tissue, though large areas of tubules may be found with no increased tissue between them. The lesions are never so diffuse as in the glomerular form. This condition of the kidney is found accompanying a general arteriosclerosis affecting all the arteries of the body, or the lesions may be most marked in the renal arteries. The kidney varies in size; it may be slightly larger, or of normal size, but it is usually very much smaller. The capsule may or may not be adherent.

The surface is more or less irregular and granular. The color red, often cyanotic. On section the cortex may be much diminished in size, of a dark-red color, the markings obscure, the glomeruli injected; the arteries in the intermediate portion are evident and often project above the cut surface. The pyramids show venous congestion. The consistency of the kidney is greatly increased. The lesions are due to a combination of causes: to the diminution in the blood-supply, to the impairment of the function of the vessels by the destruction of the muscular coat, and to the accompanying venous congestion. Most of the cases of contracted kidney belong to this class.

(c) *Chronic degenerative and interstitial nephritis.* To this class belong those cases of contracted granular kidney which occur without primary arterial lesions. It is difficult to give a name to the condition, for there is no single change which predominates. Degeneration, atrophy, and destruction of the epithelium in various places are found. There is a general increase in the connective tissue more diffuse than in the arterio-sclerotic nephritis, but not so diffuse as in the chronic glomerular form. The increase in the connective tissue is most intense where the degeneration of the epithelium is most marked. Lines of connective tissue extend to the surface, and by their contraction produce depressions. Very minor degrees of change, which may consist in small areas of cellular infiltration, with hyperplasia of the connective tissue extending down from the capsule, are very commonly found. The essential lesion seems to be a slow degeneration of the epithelium, followed by connective-tissue hyperplasia. The macroscopic appearances of the kidney vary extremely, following the different degrees of the lesion. The gross and microscopic conditions may be complicated by lesions of another character.

SENILE NEPHRITIS. In the senile kidney the chief lesions are those due to disease of the vessels. These vascular lesions are accompanied by impairment in the power of regeneration. Previous lesions of the kidney, even though slight in character, may gradually make their influence felt in impairing the resistance of the tissue. The epithelial lesions may consist chiefly in atrophy. Microscopically the kidney is usually more or less injected and atrophied. On microscopic examination the epithelium of the tubules is degenerated, small, and atrophic. The formation of yellow pigment in the atrophic epithelium is frequently seen. There is some general increase in the connective tissue, but this is chiefly marked close beneath the capsule, and may extend from here in lines into the cortex.

AMYLOID NEPHRITIS. In the amyloid nephritis, as the name implies, the characteristic lesion is the amyloid infiltration of the blood-vessels. This may occur alone and may produce certain lesions of the tissue, or it may accompany any of the other forms of nephritis. When

amyloid infiltration affects the glomeruli alone lesions closely resembling those in other forms of glomerular nephritis may be produced.

In this paper I shall give the results of the study of fifty-two cases of nephritis. They embrace acute, subacute, and chronic glomerulonephritis, acute interstitial and acute hemorrhagic nephritis. The larger part of these kidneys come from autopsies made at the Boston City Hospital, in which the bacteriological cultures of all organs were made. A part were brought to the pathological department of the Harvard Medical School for diagnosis, only the kidneys being examined; and in part they consist of old specimens in which little or nothing was known of the accompanying disease and no bacteriological examination made. The clinical histories of most of these cases are unsatisfactory. Many of them have gone into the hospital in a moribund condition, and nothing could be learned concerning them. In others little attention was paid to the examination of the urine, as attention clinically was not prominently directed to the condition of the kidneys.

The methods used for histological examination consisted in making frozen sections, in hardening the tissues in various ways, and examining sections of the hardened tissues after imbedding in celloidin and paraffin. All the modern methods of staining were used. A great deal of importance should be attached to the study of frozen sections, because only in this way can the extent of the degenerative lesions of the epithelium be fully recognized. This method was found far more satisfactory for this purpose than by the use of osmic acid.

ACUTE GLOMERULO-NEPHRITIS. The glomerular lesions in diseases of the kidney were recognized by the early investigators, but it is only of late that the important part which they play has been appreciated. Virchow described the increase in the number of cells in the glomerulus, and gives a figure illustrating the condition. Förster has described the increase in cells in the capillaries, thickening of the capillary wall, and proliferation and desquamation of the epithelial cells of the capsule. Klebs was the first to study these changes of the glomerulus more closely. He describes in the kidney of scarlet fever slow proliferation and degeneration of the capsular epithelium. He also describes an increase of the cells in the glomerulus, which he thinks comes from a proliferation of the cells of the connective tissue between the vessels. Langhans, in two publications in Virchow's *Archiv*, describes the lesions in the capillaries. He thinks that these lesions consist in proliferation of the capillary endothelium, leading to the accumulation of cells within the capillaries, and the formation of a protoplasmic network which completely occludes the vessels. Hansemann describes the cells in the glomerulus as lying between the capillaries and due to proliferation of the connective tissue.

Ribbert speaks of the importance of glomerular lesions in all cases of

nephritis. He found them not only in acute scarlatinal nephritis, but in subacute and chronic cases. Welch describes the glomerular lesions observed in the human kidney as well as those produced experimentally in white rats by the injection of cantharidin. He proposes the term desquamative glomerulitis to describe those cases characterized by proliferation of the capsular epithelium with accumulation of cells in the capsules, and the intracapillary glomerulitis to describe those cases in which accumulation of cells inside of the capillaries is the chief lesion.

I have observed twenty-eight cases in which lesions of various degrees of acuteness were found in the glomeruli, and in which, although lesions in other parts of the kidney were found, the glomerular lesions from their intensity appeared to be primary. In placing them among the acute cases the character of the lesions, and not the clinical history, has been considered. In those cases in which a clinical history referable to the kidneys has been obtained the lesions which have been considered anatomically as acute have agreed with the clinical history. In determining the acuteness of the process from an anatomical point of view the abundance of cells and the slight character or absence of connective-tissue increase have been mainly considered. Although these glomerular lesions vary, the pathological processes found in the glomeruli are too often combined to warrant us arranging them into different classes.

I shall take up separately the different processes found in the glomeruli. Proliferation of the cells in and among vessels of the glomeruli was observed in all but two cases. In a number this was the only change observed. On microscopic examination with low power the glomeruli are prominent from their increased size and the abundance of cells. They fill completely the capsular space and the capillary loops adjacent to the tubule, which causes the glomerulus often to project a considerable distance into the tubule. On section these masses projecting into the tubules may be cut across, appearing then as portions of capillaries lying within the tubules. Serial sections and sections cutting the glomerulus in other directions will show that they are always connected with the mass of capillaries. In most of these glomeruli there is no appearance of division of the capillaries into separate masses. In those cases regarded as most acute the capillary walls could be clearly distinguished. The walls of the capillaries are thickened and refractive. The cells in some cases can be seen to lie within the capillaries, but this is only the case in cross-sections of the vessels and in very favorable longitudinal sections. The vessels are so small, and their course so tortuous, that only by the most exact focussing can we distinguish those lying in the vessels from those outside. The special cells in the vessels are not leucocytes. In many cases leucocytes are found among them, and in some cases they are very abundant. The polynuclear leucocytes can always be distinguished from the other cells within the capillaries by

the form and characteristic stain of the nucleus. The other cells also differ from lymphoid cells. The nuclei are granular, and they stain brightly, but not so brightly as the nuclei of leucocytes. In some cases the protoplasm of the single cells is difficult to make out, and masses of protoplasm appear to be joined together, forming an irregular protoplasmic network within the capillary similar to that described by Langhans. The cells can be distinguished from the nuclei of the epithelium by their oval shape and the more vesicular character of the epithelial nuclei. In some cases very large cells were abundant, and granular protoplasmic masses were found within the capillaries. Many of these intracapillary cells are similar to those found in acute interstitial nephritis, which can be clearly shown to lie within the vessels, and to be probably derived from proliferation of the endothelium. In all of these cases the absence of red blood-corpuscles in the capillaries of the glomeruli is conspicuous.

In specimens hardened in Flemming's solution extensive fatty degeneration was often found in these cells, both those without and those inside the capillaries. In the specimens which were hardened in corrosive sublimate, or in fluids into whose composition this entered, the red corpuscles were stained vividly, and in some cases none, in others very few were found within the vessels. With the increase of cells within the vessels there was found associated a thickening of the wall which seemed to take place on the inside. The edge toward the lumen becomes irregular, and in some cases the lumen is almost entirely obliterated. These thickened vessels give a distinct hyaline stain, and seem to represent the beginning of the more marked degeneration of the glomerulus described in the subacute and chronic forms.

In addition to the cells a more or less irregular, somewhat granular material was found in the capillaries. It sometimes forms a reticulum among the cells, or by itself. This material did not stain as fibrin, and may have been composed of the remains of degenerated and necrotic cells. In some cases small hyaline masses were found in this reticulum.

The extent to which the leucocytes take part is interesting in view of the fact that some observers have considered most of the cells within the glomerulus to be leucocytes. In but one case were they found in the glomerular vessels in any abundance. Some of the capillaries in this case were filled with them, and they were found in considerable numbers in the glomerular spaces and in the tubules. This is interesting in view of the fact that emigration of leucocytes through the glomerular vessels has been denied. In some sections in this case they were seen in the act of emigration, part of the cells being within and part without the vessels, and both those in the glomerular capillary and those in the tubules were most probably due to emigration from the glomerular vessels. In those cases in which necrosis of groups of vessels was seen

leucocytes and nuclear detritus were found in the necrotic tissue. Hyaline thrombi were found in the vessels in three cases. In one of these all of the capillaries and some of the glomeruli were occluded; the thrombi were perfectly homogeneous, highly refractive, and gave the characteristic fibrin-reaction with Weigert's fibrin-stain. Ribert describes such hyaline thrombi in the kidneys of rabbits after staphylococcus infection, and they have been found in a variety of other acute infections. They appear to be more common in animals than in man. In one case they were found in a child with staphylococcus septicaemia, and in the other two cases no cultures were made. Fibrin within the vessels and the capillary spaces, and in the tubules, was found, both associated with hyaline thrombi in the glomeruli and without them. In one case so much fibrin was present that it must have played an important part in the formation of casts. Necrosis of glomeruli affecting small masses of capillaries was found well marked in two cases, and a slight degree was seen in some of the other cases. In the necrotic portion the details of the tissue could not be made out. The whole tissue was converted into an indefinite granular mass in which Weigert's stain showed some filaments of fibrin. Leucocytes and nuclear detritus were found in it. This definite necrosis of the tissue of the glomerulus differs from the formation of hyaline. The hyaline tissue appears both as hyaline thickening of the capillary walls and as the formation of hyaline drops in the protoplasm of the cells within the capillaries. Proliferation of the capsular epithelium plays a prominent part in the glomerular changes. In some cases this was so marked that on superficial examination the other lesions could have been overlooked. Although more marked in some cases than in others, it is impossible to divide the cases according to this lesion. It was especially evident in two cases, but was present to some extent in nearly all. Even in the most typical of the intracapillary cases among the cells there were some which, from their large size and the vesicular character of the nuclei, must have been derived from the epithelium. The proliferating capsular epithelial cells formed crescentic-shaped masses between the glomerular tuft and the capsule. The cells were usually flattened by pressure and the nuclei deformed. In some the nuclei had lost their power of staining, and the cells were converted into a more or less granular, apparently necrotic mass. Hypertrophied capsular cells connected with the capillaries by a long footstalk were occasionally found. Nuclear figures in small numbers were found in the capsular epithelium. Dilatation of the tubules was often observed, and it is difficult to explain. It is possible that it may have been due in part to pressure exerted on the tubules in some parts of their course by the cedematous intertubular tissue. In part it may be explained by a blocking up of the tubules by casts and epithelial detritus. Fatty degeneration of the epithelium was found to

some degree in almost all cases, but was in none excessive. The extreme degree of fatty degeneration which is found in phosphorus-poisoning, jaundice, and sometimes in acute pneumonia, was never present. The fatty degeneration was generally diffuse, and the fat was in small granules. Granular and hyaline degeneration of the epithelium was found both with and without the fatty degeneration. In the hyaline degeneration single cells were found enlarged and filled with large and small hyaline drops. Sections of single tubules were found filled with hyaline material. The nuclei of such cells were in some cases fairly well preserved, in others they either did not stain or were small and solidly stained. Single hyaline degenerated cells or masses of hyaline cells partly preserving the globular form, and partly moulded into hyaline cylinders, were often found in the tubules, evidently the result of desquamation of the epithelium higher up. In some of the dilated tubules the epithelium was simply atrophic. Necrosis affecting single cells and groups of cells was frequently seen. The single necrotic cells could be distinguished from the others by the homogeneous staining of the protoplasm and the changes of the nucleus. In some cases the epithelium was enormously swollen, very clear, and filled with small spaces. A very common condition found in the tubules was the presence of masses of small circles which filled up the entire tubule, the edges of the circles forming a fine reticulum. Granules were often present in the edges of the circles, both within and around them. With fuchsin the circles and granules often stained as brightly as do the nuclei. A reticulum of this character may be seen in the simple degenerative lesions of the kidney; it was often found in the capsule of the glomerulus. In one case it was very prominent, almost every tubule being filled with it. I do not know the source and the nature of this peculiar material, which may be met with in other places. I have never seen any appearances which make me believe that it can be a substance secreted by the cells. The swollen ends of the cells may be so cut by the microtome knife that they appear as circles in the tubule; but it is obvious that such an explanation will not suffice. An albuminous secretion coagulated by the hardening-agents does not take such a form, but is represented by a granular or homogeneous mass, this depending on the hardening-agent. The most marked change in the interstitial tissue of the kidney is oedema, and the increased size of the kidneys, in one case reaching 880 grammes, is generally due to this. The space between the tubules may be very wide, and is filled with a thin, sparse reticulum, in the midst of which run the vessels. The oedematous condition of the kidney is also evident macroscopically. The tissue is more succulent than normal, and in some cases pits on pressure. In the acute cases there is no actual increase in the connective-tissue fibrille. In those cases in which the lesions of the glomeruli approached the subacute form, as is shown by the begin-

ning lobulation and hyaline degeneration of groups of vessels of glomeruli, the interstitial tissue is denser and contains more cells. The cellular increase takes several forms. In the intermediate zone there is found small cell-infiltration around the larger vessels, particularly around the veins. These cells are small and similar in character to the lymphoid cells of lymphatic tissue and the blood.

As we have said, in the normal kidney small collections of such cells, probably representing small areas of lymphatic tissue, are often found around these vessels, and the increased number of cells may represent hyperplasia of this tissue. In other cases the cells have a different character. They are large; the nuclei stain brightly and contain considerable chromatin and reticulum. The protoplasm is finely granular and stains more intensely than the protoplasm of the epithelial cells. These cells are frequently found within the vessels, and many of them certainly come from proliferation of the endothelium. In several cases these cells were present in variable numbers, and in one case they were so numerous as almost to warrant us in regarding this case as a mixed form of glomerular and interstitial nephritis. In one case the connective tissue in the vessels showed the lesions of arteriosclerotic nephritis, and superadded to this there were acute lesions of the glomeruli.

In all cases the kidneys were enlarged. In adults the weights varied from 400 to 880 grammes; average weight 517 grammes. Orth gives the normal weight of adult kidneys in man as 320 grammes, and in women as 293 grammes, which is slightly under the average I have found. The weights were taken after removal of the capsule and adherent tissue of the pelvis. The capsule is usually hyperæmic; it strips off easily, even parting itself from the swollen kidney after section. The surface is smooth, or it may be irregular from accompanying infarctions or previous disease. The color varies, being usually of a light pinkish tinge, and mottled from varying degrees of congestion. There are usually small whitish foci varying in size, marking areas of more intense fatty degeneration and small points of ecchymosis. On section the tissue is distinctly moister than normal. A thin, opaque fluid is easily squeezed from it, and it pits on pressure. The cortex is increased in size, and the markings are obscure. On section of the cortex the small opacities and ecchymoses may be observed as on the surface. The glomeruli are pale and bloodless. In most cases they are easily visible and stand out from the cut surface, appearing as grains of fine sand sprinkled over it, and are rather more refractive than normally. The pyramids are usually enlarged, but relatively much less than the cortex, and may be hyperæmic.

The presence of bacteria in the kidneys or in the accompanying acute lesions was noted in eighteen cases. Their presence was determined by cultures, by microscopic examination of cover-slips and in sections. In

some cases inoculations of animals with pure cultures of the bacteria found were made. No anaërobic cultures were made. Little or no attention was paid to the colon bacilli, and in only one case in which they were found alone is their presence mentioned. In the routine cultures made at autopsy they are found so commonly and in such different conditions with and without lesions, and accompanying bacteria which may be regarded as the cause of the lesion, that we are disposed to consider them as having no specific and probably no pathogenic properties. They probably enter the tissues from the alimentary canal immediately after death or under conditions when the resistance of the tissues to their growth is diminished. There has been a notable diminution in the finding of colon bacilli at autopsies since the use of the refrigerator system, by which the bodies are kept at a temperature of 32° in the Morgue of the Boston City Hospital. Usually the bacteria found in the lesions in the kidneys were simply part of a general septicæmia. The organism most commonly found was the pneumococcus. This was found in eleven cases; in three streptococci were found; in one staphylococci; colon bacilli in one without any accompanying organism, and in two the cultures were sterile. Of the sterile cases, the kidney-lesions in one followed acute articular rheumatism, and in the other there were no lesions elsewhere. There was some general agreement between the character of the lesions and the sort of bacteria present. The most typical cases of the intracapillary glomerular lesions accompanied infection by the pneumococcus. In the streptococcus infections leucocytes entered more prominently into the process, and there was more of the acute interstitial change. In the single staphylococcus infection the hyaline thrombi in the glomeruli were the most prominent accompanying acute lesions. Endocarditis was present in ten cases. Nine of these were due to pneumococci, and one to streptococci. The endocarditis was acute and usually of the ulcerative form. In most cases the lesion was primary, and in a few only represented an acute form engrafted on an old lesion. There is a well-marked relation between pneumococcus endocarditis and that form of glomerulo-nephritis in which the intracapillary lesions are most prominent. In one case of general peritonitis, due to pneumococcus, from an autopsy of Dr. Wright's at the Massachusetts General Hospital, the kidney lesions were of the same type as those in acute pneumococcus endocarditis. In my earlier investigations so many cases of acute endocarditis were found with intracapillary lesions that I was disposed to consider pneumococcus endocarditis as the single associated condition. The pneumococcus has been present in the form of a general septicæmia in practically all cases in which the acute renal lesions were found.

In the Boston City Hospital acute croupous pneumonia, due to the pneumococcus, forms a large portion of the autopsy material. On recently reviewing the cultures made in acute croupous pneumonia we

have found that out of 110 cases 107 gave pneumococci on culture. Glomerulo-nephritis has been found to accompany the pneumonia in but one case, and in this, both from the character of the lesions in the kidney and from the clinical history, it was evident that the kidney lesion was primary. Interlobular pneumonia, with abscess due to staphylococci, was found in one case. It is very remarkable that the pneumococcus endocarditis should be so frequently accompanied by nephritis, and the acute croupous pneumonia, due to the same organism, so rarely. Erysipelas, with streptococcus infection, was found in one case; measles in two; syphilis, with the constantly accompanying streptococcus infection, in two, one of which was combined with measles. Acute articular rheumatism was found in one case; acute streptococcus infection following abortion in one; scarlet fever in one; diphtheria in one; gonorrhœa in one, and in one acute pneumococcus peritonitis. The presence or absence of œdema was noted in fourteen cases. Of these it was present in ten cases. In seven of these cases there was acute endocarditis, with extensive valvular lesions, in one erysipelas, and in one acute articular rheumatism.

SUBACUTE AND CHRONIC GLOMERULO-NEPHRITIS. I have included with the acute cases the cases of subacute and chronic glomerulo-nephritis because their consideration obviously follows in this place, and every gradation from the acute to the subacute and chronic can be followed.

This condition of the kidney has been known under various names. It is the large white kidney of Wilke and the chronic parenchymatous nephritis of modern writers. There is no doubt that the amyloid kidney was and still is frequently confounded with it, and without staining for amyloid they often cannot be distinguished. In the amyloid kidney there is the same degeneration of the epithelium, due most probably to the same cause. Disease of the glomerulus interferes with the circulation within it. In the amyloid kidney the vessels of the glomeruli are occluded by amyloid material deposited in the walls of the vessels and between them. In the chronic glomerulo-nephritis the occlusion is brought about by hyaline degeneration. In both the duration of the process varies, and in both there may be extensive destruction of the parenchyma, followed by a general increase in the connective tissue. It is convenient to separate them by the presence of amyloid in one; but apart from the amyloid the process is very similar, although the deposit of amyloid in the glomerulus is not preceded or accompanied by cellular proliferation. In a review of the lesions of these cases the glomeruli claim our chief attention. Much that we have stated of the condition of the glomeruli in the acute glomerulo-nephritis is clearly applicable here. Slight differences in the degree of involvement may be found in different glomeruli and in different parts of the same glomerulus. All of them show an increase in the number of cells. In places

conditions resembling the acute forms are seen, the cells being greatly increased in number, and lying for the most part within the capillaries. A condition of lobulation of the glomerulus is one of the most prominent lesions. Even in the acute form a division of the glomerulus into more or less definite lobules is often seen. In the more marked form the glomerulus appears to be divided into a number of definite lobules, the separation between them extending down to the root. Cross-sections of the glomerulus and root usually show four to six such lobules. In sections passing through the glomerulus in the other direction as many as eight distinct and separate masses can be found; with the lobulation the hyaline degeneration of the glomerulus advances. The hyaline degeneration appears first in the outlying capillary loops, those most distant from the root. At first only small portions become hyaline, and by gradual extension whole lobules and even whole glomeruli are so altered. The hyaline material is homogeneous, it stains brightly with eosin and with acid-fuchsin, and in alcoholic specimens saffranin gives it a faint bluish or lilac hue. The hyaline appears to be formed in two ways, finally becoming united into a single mass. The membrana propria of the capillary wall becomes swollen, and takes on a hyaline stain. Cells lying within and between the capillaries show hyaline droplets in their interior just as do the cells of the tubules, and the hyaline material so formed may become fused together with the production of irregular hyaline masses in which remains of nuclei and particles of chromatin may be occasionally found. Such hyaline material, unlike the hyaline thrombi, does not take the fibrin-stain. In the hyaline masses small spaces, with here and there red corpuscles or leucocytes, mark the vessels. Dilated vessels filled with red blood-corpuscles are occasionally found. At first there seems to be no increase in the number of nuclei. They are crowded together in a hyaline mass and show various differences in form and staining. Most of them are irregular and elongated, and stain homogeneously. The protoplasm of the cells belonging to them is merged into the hyaline mass. Very thin sections in places where the hyaline formation is not advanced enable us to gain some idea of its mode of formation. Occasionally capillaries are found cut longitudinally in which the lumen is exceedingly small and irregular, and the wall thickened apparently by the formation of hyaline on the inner wall of the vessel. Nuclear detritus is found to some extent in the hyaline material. All the cases in which fresh examinations were made, or in which portions of the tissue were hardened in Flemming's solution, showed a considerable fatty degeneration of the cells of the glomeruli. The capsular epithelium in most cases shows some hyperplasia. Flattened epithelial cells derived from the capsule are found in the capsular spaces and between the lobules of the glomerulus. In some cases the growth is excessive, and sections passing at right-angles to the root of

the glomerulus showed the single groups of hyaline vessels completely surrounded by epithelial masses derived from the capsular epithelium. The nuclei in the epithelial cells are frequently irregular in form and atrophic, and the cells converted into a more or less granular mass. Various degrees of connective-tissue formation take part in the capsular change. Bands of connective tissue extend from the capsule into the epithelial masses, more or less dividing them, and connective-tissue fibres are shown by the Van Giesan stain among the cells. There is no evidence of connective-tissue formation from the capsular cells, but in all instances it seems to have gone into the masses from the connective tissue of the capsule. The connective tissue of the capsule is found thickened and the cells in it increased in number. The hyaline masses of the glomerulus are often found adherent to the capsule, and in one specimen there was a long, projecting mass of connective tissue which extended from the capsule down to the root of the glomerulus, and which contained several wide vessels. The epithelium of the tubules showed extensive degeneration which did not differ materially in kind from that described in the acute forms. The tubules are found dilated and filled with desquamated cells, hyaline material, and glomerular debris. In one case the epithelium of the dilated convoluted tubules was atrophic and the cells crescentic in form. The tubules in this case contained great numbers of these crescentic-shaped cells, which seem in part to be due to desquamation in the tubules; in part to come from the glomerular capsules in which there is extensive hyperplasia. Hyaline degeneration of the epithelium was found in every case. There is a varying degree of involvement of the connective tissue of the kidney. It is always slightly increased, and in the more chronic cases there is a general growth extending diffusely throughout the tissue. The diffuseness of this connective-tissue formation explains the absence of granular contraction of the surface, even though the kidney, as a whole, may be atrophied. That the subacute and chronic glomerulo-nephritis represents a more marked condition of lesions of the same general character as those found in the acute form is evident. In both the glomerular changes are the most striking lesions. Changes similar to the acute, consisting in the increase of cells in the capillaries and hyperplasia of the capsular epithelium, are found in the chronic. In the chronic there is a greater degree of hyaline degeneration, partly from conversion of the cells into hyaline, partly from hyaline degeneration of the walls of the vessels, followed by contraction, by which the lobulation becomes pronounced. The degree of the connective-tissue formation seems proportionate to the degree of epithelial degeneration and desquamation, and probably follows it. Macroscopic appearances of these kidneys vary greatly; they were usually of somewhat increased weight. The lowest weight found in the six cases at the Boston City Hospital was 300 grammes, and the highest 425 grammes.

Of the two cases in which the lowest weights were found, one was a boy of twelve years, and the other a girl of sixteen years. The average weight of the six cases was 395 grammes. The macroscopic appearance of the kidneys also varies. The capsule strips off easily. The cortex of the kidney is smooth, rather paler than normal, and the surface is marked with small, white, opaque spots, and by small foci of ecchymosis. On section the markings of the cortex are obscure, the consistency of the kidney is increased. The glomeruli may be seen on the cut surface as small, pale, projecting points. No complete history of the duration of the disease could be obtained. The longest history was that of six months, and the shortest two months. An accompanying acute rheumatism was found in two cases; two attributed the disease to having taken cold, and in one case there was an acute endocarditis engrafted on an old lesion. Nothing of any importance was learned from the bacteriological examination.

ACUTE INTERSTITIAL NEPHRITIS. This form of nephritis was first described by Wagner under the name of lymphomatous nephritis, and he makes it one of the four forms of Bright's disease. He says it is most frequently found in scarlet fever, but may be found in typhoid. The kidneys are large and pale. Hemorrhage may be present in slight degree or entirely absent. The most characteristic lesion is an accumulation of round cells of various sizes, which are most numerous around the glomeruli. Others have described these lesions in the interstitial tissue, but they have not been regarded as sufficiently marked to constitute an anatomical type of nephritis.

Orth has an interesting description of the process in his text-book of *Pathology*. He says he has seen kidneys in which there were none or very very slight lesions of the epithelium and glomeruli, but in which there was a small cell-infiltration in the interstitial tissue. He describes such kidneys as large and pale. Regarding the origin of the cells, he says they have a large, round, vesicular nucleus, and differ from the ordinary emigrating leucocytes. He thinks they may be derived from proliferation of the tissue-cells, although their position around the veins would show that emigration also plays a part in their production.

There is a liability to confusion in giving the name acute interstitial nephritis to this process because this name is frequently used to describe purulent nephritis. The lesions in the interstitial tissue are so marked that no other name is fitted to describe them. The essential lesions are in the interstitial tissue, and are so prominent and accompanied by so little change in the parenchyma that they cannot be regarded as secondary to parenchymatous lesions. While there is no doubt that lesions of the parenchyma of a tissue, when they are sufficiently extensive and when long enough time elapses, will be followed by a growth of interstitial tissue which has the effect of making good the loss, there is equally

no doubt that there can be primary lesions of the interstitial tissue. The cells in this case are in a way similar to those seen in acute hyperplasia of the connective-tissue cells, particularly those of the walls of the bloodvessels occurring under other conditions. Similar cells to these may be found in rapid proliferation of subcutaneous tissue in the vicinity of wounds, and it is probable that they have the same origin. The cells seem in large part to come from the endothelium of the bloodvessels, the small veins, and capillaries. So far as I have been able to see, the arterial endothelium takes no part in the process. The cells are found in the greatest numbers in the lower portion of the cortex, which we have designated as the intermediate zone, though by no means confined to this. There are both a general and a focal increase in the cells. The focal increase is found chiefly around the glomeruli, extending from these into the surrounding intertubular tissue. The cells of the connective-tissue capsule of the glomeruli and the capsule around this take part in the process. Among these cells leucocytes are present in variable numbers, and the process is probably accompanied by emigration. The leucocytes are found both in the interstitial tissue, between the cells, and in the degenerative and necrotic epithelium of the tubules in their midst, and in the lumens of these tubules. None of the large cells are ever found within the tubules. In all of the cases there is more or less degeneration of the epithelium, which is more marked where the interstitial cellular infiltration is most prominent. Elsewhere throughout the kidney the degeneration, though present, is not so marked. In those cases in which fresh examinations were made fatty degeneration was found. In none of the cases were the glomeruli affected. The degeneration of the tubular epithelium in the interstitial infiltration may be partly due to pressure exerted by the masses of cells. It is probable that in this case we must assume the presence of a toxic material which exerts its action on the constituents of the kidney tissue, and which at the same time leads to a degeneration of the parenchyma and proliferation of the interstitial tissue. The macroscopic appearance of the kidneys is characteristic. They are enlarged; the capsule is often so tightly stretched that on section it bursts from the tissue of the kidney. The increase in size of the kidneys is in the cortex. Beneath the capsule the kidneys are pale, more opaque than normal, and with areas of hyperæmia and few ecchymoses. On section they often present the appearance of abscess-formation. Just above the pyramids extending in lines up into the cortex there are opaque masses appearing as abscesses from which a purulent-looking fluid can be squeezed. The markings of the cortex are completely obscured; the glomeruli are not visible.

In the nine cases of this which I have seen, in one the age could not be ascertained; one was from a woman aged thirty years, and the others were from children, the oldest eleven years.

Bacteriological examination was made in but five cases, and in all of these general streptococcus infection was found, combined in one case with a general infection with the diphtheria bacillus. The associated disease was ascertained in eight cases. In four of these there was scarlet fever; in one diphtheria and scarlet fever; in two diphtheria, and in one endocarditis following abortion. In none of the cases was there any oedema, and in none was attention particularly directed to the kidneys during life.

ACUTE HEMORRHAGIC NEPHRITIS. In this the chief lesions consist in hemorrhage accompanied by a varying degree of degeneration of the epithelium. Only three cases were met with. Two of these were from typhoid fever, and one from a case of acute endocarditis with infectious pneumonia. The character of the pneumonia was not described, but it was probably embolic. The hemorrhages in these cases were added to acute degeneration. In most of the cases the hemorrhage appears to take place from the glomerulus. In one case there was extensive hemorrhage in the tubules without any change in the glomeruli.

TUBERCULOUS OCCLUSION OF THE OESOPHAGUS, WITH PARTIAL CANCEROUS INFILTRATION.

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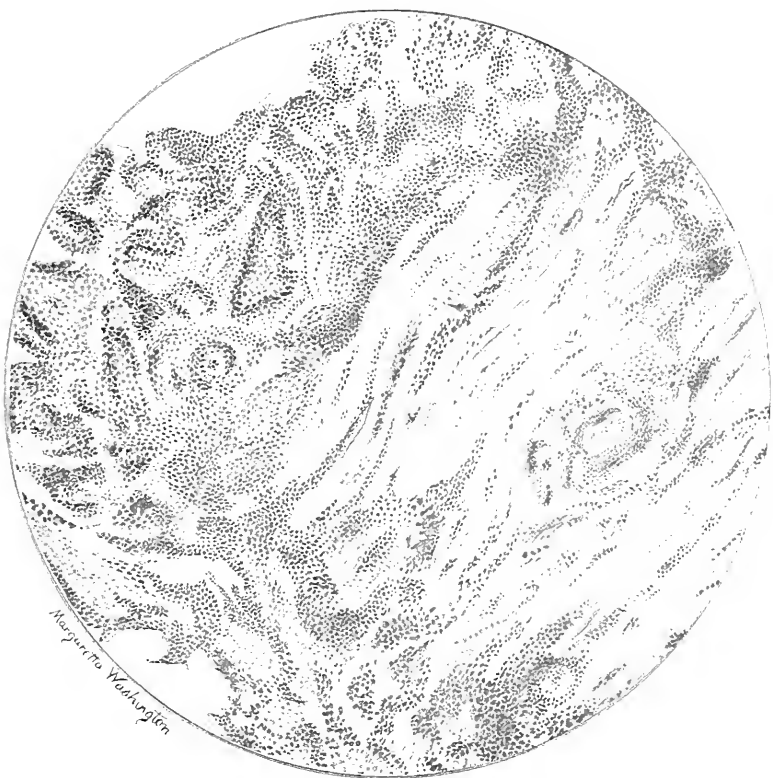
(From the Pepper Laboratory of Clinical Medicine, No. 7.)

On December 3, 1895, was admitted to the University Hospital a Russian cigarmaker, aged forty-two years, who had been seven years in America.

His family history had no bearing on the case, and was entirely good. His father died at the age of sixty-eight, of pneumonia. His mother was killed in an accident, and his brothers and sisters, five in number, were living and well. There was no history of consumption or cancer in near relatives.

His personal history up to March, 1895, was good, and he could remember no serious illness. He had never suffered any injury to the oesophagus. Syphilis was denied, and he had no evidences of it.

In March, 1895, he had a severe and somewhat protracted cold. From this he recovered, but noticed, almost at once afterward, a feeling of constriction and oppression in his throat. Later he found swallowing was becoming difficult, and increasingly so. Once, upon attempting to force down with his finger a piece of meat that had caught in his throat, he vomited, and the vomit contained blood. With this



Section from the junction of the cancerous and tuberculous tissues, showing the cancer-nests suddenly ceasing and replaced by fibrous tissue, with a good deal of round-cell infiltration, the latter here not showing any typical tubercles though somewhat clumped.

exception there was never vomiting, regurgitation, or discharge of blood. Severe pain was never present, and the history was solely that of dysphagia of increasing degree and with moderate loss of strength up to July, 1895. At that time his voice became weak and hoarse, and he found, for a time, he could not swallow even milk, and his strength failed so rapidly he had to give up work. Not long after he again became able to swallow liquids, but could never afterward take solid food. The hoarseness persisted and increased, as did the loss of flesh and strength, and in September he was admitted to the Jefferson Hospital, where the stenosis was diagnosticated and a gastric fistula established by Dr. Keen, with entirely successful operative result.

He recovered well from the operation and left there six weeks after admission, and had since been fed through the tube in his fistula. His general condition, however, grew worse, and upon admission to the University Hospital he was anæmic and much emaciated, his pulse weak and temperature subnormal, and his voice very weak and hoarse.

He complained only of his weakness, an absolute inability to swallow, and of a feeling of oppression in the chest that he could not exactly localize. He had, however, a frequent, hawking cough, with profuse expectoration, largely saliva, containing some thick mucus and pus. The examination of the oesophagus by bougie showed an impassable stricture at its commencement. The cervical glands were enlarged and two of them were softening.

Over the front of the chest on both sides the percussion-note was hyper-resonant. Posteriorly there was slight dulness at the vertebral border of the left scapula and beneath the ridge of its spine. Elsewhere the note was normal. The tactile fremitus was alike on both sides. Air seemed to enter both lungs equally, and the breath-sounds were themselves normal, but accompanied by some dry râles and inspiratory crackles in both apices posteriorly.

The heart-sounds were clear and rapid; the second sound accentuated. The cardiac dulness was of normal area.

The stomach-area, determined by percussion and auscultatory percussion, was somewhat enlarged, reaching from the fifth interspace downward to a finger's breadth above the umbilicus. There was a healthy gastric fistula holding a rubber tube.

Examination of his sputum for tubercle-bacilli was negative. His urine was normal in appearance and contained neither albumin nor sugar.

The examination of his blood showed 3,272,000 red corpuscles, 6250 white, and 40 per cent. hæmoglobin. He improved for a few days, and was examined by Dr. Grayson by laryngoscope. Dr. Grayson reported thickening of the ary-epiglottic folds and a complete occlusion of the oesophagus in the transverse diameter at its junction with the pharynx. The mucous membrane above was normal, and there was no ulceration, proliferating growth, or other evidence of malignancy. This led to the diagnosis of tuberculosis as the cause of stenosis. Especial thought was given to compression from enlarged glands, but from the situation and completeness of the occlusion it was held probable that there was at least a coexisting tuberculosis of the wall of the oesophagus. Operation was considered with the view of removing any glands that might be causing compression, and, if possible, reopening the lumen. His condition, however, was too bad to warrant operation, and it was deferred

while endeavoring to improve his general strength; but his cough increased and he began to show some irregular elevation of temperature, and the respirations grew more frequent. A few days after admission tubercle-bacilli were for the first time found in the sputum. He was losing weight and growing weaker. His breathing and voice were so weak that the lung-signs were difficult to elicit, but six weeks after admission there was added to his previous signs dulness, with prolonged expiration at the middle of the right scapula. At this time abscesses formed in the glands in the neck on the right side, and were opened. The pus showed no tubercle-bacilli, but many staphylococci. There was a continuous slight increase in the signs in the lungs and loss in weight and strength until, on March 18, 1896, he grew decidedly worse, with signs of catarrhal pneumonia of the right base. Next day this was outspoken and the left base was partially consolidated, and he died two days later.

The repeated examinations of his stomach-contents were carried out at various times after the administration of different test-meals—milk, milk and eggs, Boas oatmeal soup, and the same with egg-albumin added and the Ewald-Boas bread and water. The results varied but slightly at any time. On one occasion only, forty-five minutes after the administration of milk and eggs, was free hydrochloric acid shown by the phloroglucin-vanillin test, and this was but a faint reaction. The total acidity varied but little at any time, and was very low, ranging, expressed after the manner of Ewald, from 6 to 10. Quantitative estimations of the total hydrochloric acid by v. Jacksch's¹ modification of Sjoquist's method and that attributed by v. Leube² to Braun gave as its highest point 0.0329 per cent. and from this downward, some loosely combined chlorides always being present.

Lactic acid was never present, using both Boas's³ and Uffelmann's test. Starches were not changed, and the gastric contents never showed any digestive action upon albumin, and tests for peptone at any interval were always negative.

The milk-curdling ferment was present, as was its zymogen, but both in small quantity and not active. With Boas's⁴ method for their quantitative determination a dilution of 1 to 5 was sufficient to stop the action of the ferment and 1 to 15 of its zymogen. The motor activity seemed to be decidedly excited, as test-meals containing a pint of fluid and removed after fifteen minutes, half an hour, and so on to an hour and a half, showed, at the latter interval, never more than 3 or 4 c.cm., and only occasionally was there more remaining after one hour. After half an hour the quantity was usually about 20 c.cm. This was perhaps explained post mortem by the partial hour-glass contraction of the stomach. Probably more remained in the lower section, but could not be reached by the tube.

The results of the examinations for free hydrochloric acid are like those of Neschaieff,⁵ who found it absent in four cases of cancer of the

¹ v. Jacksch. Klinische Diagnostik.

² v. Leube. Diagnose der Inneren Krankheiten, Bd. I. S. 272.

³ Boas. Deutsch. med. Wochenschr., 1893, No. 34.

⁴ Boas. Diagnostik u. Therapie der Magenkrankheiten, Th. I., 3te Auflage, S. 189.

⁵ Neschaieff. Lancet (abstract), June 4, 1887.

œsophagus. Ewald¹ also investigated the HCl production in a number of patients with cancer of the cardia upon whom gastric fistule had been made, and found it always absent whether the disease was upon the gastric or œsophageal surface of the cardia, and in a number of cases of the same nature examined by means of the stomach-tube he found the same lack of digestive activity. Combining these results with those of Neschaeff, he concluded that the introduction of food into the stomach through a gastric fistula would result only in its fermentation; he therefore advises that the fistula be established as near as possible to the pylorus, so that the tube, and thus the food, may be carried directly into the duodenum. On the contrary, Riegel² has examined two cases, Sidney Martin³ one, and Boas⁴ one, the location of the disease not mentioned; Mintz⁵ three of the cardia and Boas⁶ one in this location, in none of which cases was there any change in the HCl from the normal. In one of Mintz's cases the motor activity of the stomach was decreased, and in one no free HCl, but the combined chlorides normal, while Riegel⁷ had a further case in which the secretion was at one time lessened but afterward normal.

There seems, therefore, no definite present knowledge of an ill effect of even cancer at the cardiac end of the œsophagus upon the gastric functions, while it would appear very unlikely that the pathological condition found in this case would have any specifically harmful action. The conditions found here seem much more probably due to the man's general condition and to the absolute nature of the occlusion, which not only prevented his taking nourishment in the normal manner and condition, but, perhaps more important, prevented the entrance of saliva into his stomach with or without his food, and the preparation of it by mastication. Sticker⁸ found in a case with very poor secretion of saliva and symptoms of gastric insufficiency that the gastric symptoms quite disappeared and the patient was restored to full health within two weeks after re-establishing free secretion of saliva with jaborandi. He tested the condition of the gastric contents in another case after a test-meal administered through a stomach-tube, and after which no saliva was swallowed, and after the same meal masticated and swallowed with saliva, and found much better secretion and motor action after the latter. Biernacki⁹ has elaborated the latter experiment, and Friedenwald¹⁰ has

¹ Ewald: *Klinik der Verdauungskrankheiten*, 1893, Bd. ii. S. 148.

² Riegel: *Zeitschrift f. klin. Med.*, Bd. xii. S. 434.

³ Sidney Martin: *Functional and Organic Diseases of the Stomach*, p. 87.

⁴ Boas: *Deutsch. med. Wochens.*, 1893, n. 39, 5.

⁵ Mintz: *Wiener klin. Wochens.*, 1896, n. 3.

⁶ Loc. cit.

⁷ Loc. cit.

⁸ Sticker: *Volkmann's Sammlung klinische Vorträge*, 1887, 297.

⁹ Biernacki: *Zeitsch. f. klin. Med.*, Bd. xxi., Heft 1 u. 2; *Zeitsch. f. Biologie*, xxvii. S. 49-71.

¹⁰ Friedenwald: *Internat. Medical Mag.*, August, 1896.

repeated Biernacki's experiments, both administering first the test-meal without saliva, and, after expressing this, washing out the stomach; and administering the same meal with saliva Biernacki found, in health, the secretion of HCl and the motor activity much greater when the meal was masticated. Pepsin digestion was but little increased, and the absorption, tested by potassium iodide, was the same in either case. In a number of cases of disease, except in cases of gastrectasia and carcinoma and in pulmonary tuberculosis, he found the motor activity and secretion of HCl much increased, and the activity of the pepsin was even three times as great as with absence of saliva. Friedenwald got, in general, much the same results, and also investigated the action of the milk-curdling ferment and found it much greater when the meal had been masticated without saliva; it took from five to thirty minutes longer to coagulate milk.

This increased activity of the gastric functions is present even after the destruction of the ptyalin, as Biernacki has shown, and is therefore not due to this action, nor is it due solely to the presence of the saliva, as meals containing saliva but not masticated brought forth much less gastric action than those masticated. Biernacki holds this due to a regulation of the reaction of the food taking place within the mouth during mastication, while Friedenwald's experiments do not confirm this, and he simply refers it to an unknown effect produced during mastication.

That there is a definite increase of the gastric functions caused by mastication and in salivation can scarcely be doubted, and it seems probable that the experiments would have shown a greater increase had the diurnal variation in activity been excluded by making several observations upon each case with the two test-meals administered on separate days, instead of by administering both on the same day, the meal with saliva immediately following that without. The latter method would seem to be the disadvantage of the meal with saliva.

The post-mortem conditions in our case were as follows:

Body much emaciated; fistulous opening in the epigastrium. The deep group of cervical lymphatic glands cheesy and suppurating.

Thorax: about 200 c.c.m. of clear serum in the right femoral cavity; a small amount in the left.

Pericardium moderately distended with straw-colored fluid.

Heart: weight gram, 160; small and dark. The visceral pericardium wrinkled; subpericardial fat along bloodvessels white and gelatinous; valves healthy.

Lungs: right apex firmly adherent to the deep cervical tissues; on section contained a number of hard sclerotic and calcareous nodules. The lower part of the upper lobe normal. The middle lobe intensely oedematous; the lower lobe congested, oedematous, and irregularly consolidated in lobular areas. At its apex same thickening. The left apex less adherent, in other respects similar to the right; bullous emphysema

of the superficial portion; distinct lung-stones in places. Lower lobe similar to lower right lobe. At its topmost part consolidation of fibrous character, and on section tubercular-like areas.

Abdomen: firm adhesions between the stomach and abdominal wall for a half-inch about the site of the fistula; otherwise the peritoneum normal. Kidneys, suprarenals, and spleen normal. Liver small and congested.

The œsophagus, larynx, and stomach removed *en masse*. The stomach hour-glass shaped, due apparently to contraction of new-formed tissue at the seat of operation. The pyloric part of the stomach the size of a small orange; the part above the constriction—the body and fundus—was alone about the size of a normal organ. It contained gas and curds of milk.

The *œsophagus*: patulous and normal as high up as the level of the arch of the aorta. Above this point and to the junction with the pharynx—to a point just beneath the vocal cords—the lumen had entirely disappeared and its situation could not be traced. The surrounding tissues and œsophageal walls had formed a band of firm fibrous tissue about a half-inch in thickness and one and a half inches in breadth. The whole mass was firmly bound to the vertebrae.

The *larynx*: the ary-epiglottic folds were thickened and œdematous. Cricoid cartilage thickened.

Pathological diagnosis: tuberculosis of the larynx, cervical glands, œsophagus(?), and lungs, deglutition-pneumonia. Upon microscopic examination of the lungs was found the confirmation of the macroscopic diagnosis. At the apices was great thickening, with obliteration of many of the air-spaces, and thickly scattered throughout the tissue were many collections of round- and giant-cells, a few of which masses were becoming cheesy in the centre. In the lower lobes catarrhal pneumonia, with occasional miliary tubercles.

The sections of the growth from portions taken from the junction with the normal mucous membrane show at once cancerous tissue in a general fibrous tissue-basis. The fibrous tissue is exceedingly dense, arranged in bands with a little areolar tissue between the bands, and in this areolar tissue and about the cancer-nests there is a marked, often quite dense, round-cell infiltration, here and there somewhat in clumps, but not characteristic. The epithelial cells are, at the periphery, almost entirely in cancer-nests, in some places irregularly scattered and seemingly remnants from the œsophageal mucous membrane. Below the free edge there is not so distinct an arrangement in nests of cells, but there are long tongues of cancerous tissue extending into the here still more compact fibrous tissue. There is an extremely large number of pearly bodies in and near the cancer-nests and prolongations; in a few of the nests a good deal of formless débris, or a goodly number of round-cells among the epithelial. In numerous places there are well-defined clusters of round-cells, with sometimes a few rather irregularly arranged epithelial cells in or near the centre, sometimes a distinctly formed nest at this point. Sections from deeper within the general mass show, at the end toward the free edge, the process in much the same condition as in the deeper portions of those described—the cancerous tissue mostly in the form of prolongations, with many pearly bodies; much fibrous tissue, irregularly arranged; and still much round-cell infiltration, though not so dense as in the free edges. This ceases

rather sharply, and the fibrous tissue beyond is arranged transversely and in distinct bands, separated by areolar tissue, all freely infiltrated with round-cells, but showing almost no cancerous tissue. In some sections there are no epithelial cells, separate or in groups; in some one or two small nests, and in some three or four, but never a large number. But the round-cells here, and more especially on the lateral borders, assume a more interesting character. They are frequently collected in small, dense masses, sometimes not well outlined, but occasionally well defined and irregularly round, with an occasional giant-cell near or beyond the periphery of the group. Some of these tubercle-like masses are undergoing fibroid change. Many are situated at a distance from the cancerous tissue, so that they do not seem dependent upon its irritant action for their formation, and they are largely at the lateral borders.

Sections were stained several times for tubercle-bacilli, without positive result; but some were finally found in which there were two or three of the bacilli to a slide. These were all near the exterior of the growth and in the neighborhood of the tubercles.

From these appearances the original cause of the disease was evidently tuberculosis, while the cancer subsequently infiltrated the occlusion. That the cancer was primary is very improbable, both from its evident appearance, microscopically, of infiltration of a previously existing mass and from the history of cancer being here as elsewhere one of inexorable growth and onward progress, ulceration, and sloughing. Here the central fibrous portion, at least, is in all active effects healed.

The possibilities that the stenosis might have been originally syphilitic or subsequent to trauma seem excluded by the lack of history of syphilis and of its clinical or post-mortem lesions, and, as to trauma, only a very extensive injury could have produced so extended contraction, and this must have left a vivid memory of its occurrence, while he stated that he had suffered from no injury.

That the original tubercular disease had occasion for its origin given by partial obliteration of the lumen by an enlarged gland and abrasion of the projecting portion is possible. But, although the suggestion of the possibility of obstruction of the oesophagus by enlarged glands was first made by Vesalius, the number of cases in which this condition has been found is small. Barety,¹ in twenty-six cases of compression of important structures by bronchial glands, found the oesophagus involved but once; while Hofmokl,² who had two cases, could find but one other to add to the list, and that not severe.

Körner³ considerably increased these figures two years later with two cases of his own, of which, however, but one was examined post mortem, and nine others from literature. If to these be added Habershon's, which Körner mentions, but leaves out of the count, Barety's

¹ Barety: *L'adénopathie trachéobronchique*.

Hofmokl: *Archiv f. Kinderheilkunde*, 1882 '83, iv. 8, 81-87.

Körner: *Deutsch. Arch. f. klin. Med.*, 1885, n. 37.

and one reported by Janeway,¹ the known number at that time remains very limited. This consideration would, however, include only those cases in which there is compression. Traction from contracted glands, which did not exist in our case, is far more frequent.

Microscopic findings resembling ours have been described but three times, and of these the account of Tissier² is an incomplete one of a cicatricial contraction of the œsophagus at the level of the tracheal bifurcation, with a fistulous opening into a pouch caused by suppurating bronchial glands, which pouch also communicated with the right bronchus. The upper and lower borders of the stenosis showed slight cancerous infiltration. Further description is not given. Cordua³ and Zenker⁴ have reported each a case of cancer in which miliary tubercles and tubercle-bacilli were present. Both, however, believed the tuberculosis was secondary to the cancer—Cordua thinking the tubercular infection came from the lungs through the lymph-channels, while Zenker gave the much more acceptable etiology of destruction of the mucous membrane by the cancer, thus giving entrance to the bacilli from the lumen of the œsophagus.

Tuberculosis of the œsophagus, of itself, is somewhat more common, though still very rare. Many works on pathology, as Cornil and Ranvier,⁵ Ziegler,⁶ Hamilton,⁷ and others dismiss it with the note of its occurrence and rarity, or do not mention it at all. Orth⁸ gives it consideration and thinks it more common than usually supposed. He has himself observed three cases which were confirmed by microscopic examination, and in two of them tubercle-bacilli were found.

Birch-Hirschfeld⁹ has observed in a man dead of tuberculosis of the lungs tuberculous ulcers of the larynx, pharynx, and upper third of the œsophagus.

Of clinical works Cohen¹⁰ mentions it as a cause of stricture, Osler¹¹ refers to it as a pathological curiosity, while v. Leube,¹² Strümpell,¹³ Eichhorst,¹⁴ and others do not mention it.

Such statistics as are available warrant this treatment, the most extensive being those of v. Willigk¹⁵ and Säger.¹⁶ The former examined

¹ Janeway : Trans. New York Path. Soc., November 27, 1872.

² Tissier : Annales des maladies de l'oreille, du larynx, du nez et du pharynx, Nov. 1887.

³ Cordua : Arbeiten aus dem Patholog. Inst., Göttingen, 1893, S. 147.

⁴ Zenker, K. : Deutsch. Arch. f. klin. Med., Bd. xvii, S. 191.

⁵ Cornil and Ranvier : Manuel d'histologie pathologique.

⁶ Ziegler : Lehrbuch der Pathologischen Anatomie.

⁷ Hamilton : Text-book of Pathology. ⁸ Orth : Allgemeine Pathologie, 1887, p. 681.

⁹ Birch-Hirschfeld : Pathologische Anatomie, Spec. Th. 2te Hälfte, 4te Auflage, S. 620.

¹⁰ Cohen : Ashhurst's Encyclopedia of Surgery, vol. ii.

¹¹ Osler : Practice of Medicine, p. 240.

¹² v. Leube : Diagnose der Innerenkrankheiten.

¹³ Strümpell : Pathologie u. Therapie der Innerenkrankheiten.

¹⁴ Eichhorst : Specielle Pathologie u. Therapie.

¹⁵ v. Willigk : Prager Vierteljahresschrift, 1856, xiii, 2 u. 3.

¹⁶ Säger : Archiv f. Heilkunde Jahrgang, xix, S. 448. Anmerkung.

1317 records and found but one case, while Sanger found five cases in 1226 records. He included the cases reported by Chyostek¹ and Paulicki,² which were not verified by microscopic study, and the one case v. Willigk found was not verified.

K. Zenker³ considered this infrequency due to the short time the ingesta remain in the oesophagus, and, more especially, to its thick layer of epithelium, which prevents, in ordinary conditions, the abrasions which might give entrance to the bacilli. In support of this, and as evidence of the *role* played by injuries of the mucous membrane, he refers to the cases reported by Breus,⁴ occurring subsequent to the destruction of the mucous membrane by swallowed lye; Eppinger,⁵ where the tuberculosis was found beneath a mass of thrush, and Kundrat, in which the original injury was due to sulphuric acid; and, further, to his own case and Cordua's, previously mentioned, in which cancerous ulceration preceded the development of tuberculosis. Cases have, nevertheless, been reported since 1716, when Mangetus⁶ described a case of which a meagre abstract is given by Mauchart in his dissertation on "*Struma Oesophagi*." The diagnosis of the condition was at that early date impossible, of course. It was described, however, as a complete occlusion of the oesophagus for several inches by its conversion into a fibrous band, all lumen having disappeared. This was thought to be due to pressure from enlarged glands and their subsequent contraction, including the oesophagus, the whole mass becoming fibrous. This description bears great resemblance to our case, but must end with resemblance. Beuller's case, which Mauchart reports at the same writing, can be dismissed at once as in all probability cancer with gangrene of neighboring organs.

Sommer's⁷ case, reported undiagnosed, was perhaps cancer, but at this day would have been worthy of careful study. There was an ulcer of the pharynx with a callous base, and in the oesophagus just below this were a number of tubercles containing cheesy matter. Some of these had ruptured and left superficial ulcers. There was an opening below communicating with the trachea, and the mucous membrane of the latter was ulcerated in spots. The other organs were normal.

Subsequent to this report the literature is barren of suggestive cases until those of Chyostek⁸ and Paulicki⁹ in 1868. Both of these showed ulcers of the oesophagus of distinctly tubercular, gross appearance and

¹ Chyostek: Oesterreich. Zeitsch. f. praktische Heilkunde, xiv. S. 497.

Paulicki: Virchow's Archiv, Bd. xlii. S. 373.

² Zenker, K.: Deutsch. Archiv f. klin. Med., 1895, iv. Festschrift.

³ Breus: Wiener med. Wochensh., 1878.

⁴ Eppinger: Prager med. Wochensh., 1881, ii. 51 u. 52.

⁵ Mangetus: Theat. Anat., 1716. Quoted by Mauchart, Haller's "*Disputationes Chirurgicæ*."

⁶ E. E.

⁷ Sommer: Rust's Magazine f. d. gesammte Heilkunde, 1823, xv. S. 364.

⁸ Chyostek: loc. cit.

⁹ Paulicki: loc. cit.

in tubercular subjects. Chvostek's, however, does not appear to have been examined microscopically, while Paulieki could only exclude cancer by his histological examination, and could not find any distinct evidence of tuberculosis. Kraus,¹ in the following year, published as tuberculosis a case in which he found an ulcerated "tubercular" ring, two inches in width and four inches above the cardia, and which communicated by a small opening with cavities in the middle and lower lobes of the right lung. The ulcer showed a variety of what he considered tubercular stages. The case is certainly suggestive, but on these doubtful appearances and in the absence of microscopic examination it cannot be positively considered tubercular. The next case, that of Breus,² is the first one with really strong claims to acceptance. In this there were ulcers of the pharynx, œsophagus, and stomach, in a case of generalized tuberculosis, and the histology of the œsophageal ulcers was that of tuberculosis. There was a history of injury from drinking lye and of stenosis coming on subsequent to this.

A case of Peter's³ seems very probably actual tuberculosis, though only the gross lesions were described. They were: stenosis from drinking sulphuric acid, with several tubercular-like ulcers in the œsophagus, in a subject with pulmonary and intestinal tuberculosis. Eppinger's⁴ seems almost secure in diagnosis—a woman with advanced phthisis and with her œsophagus almost stopped up with a mass of thrush. Beneath this were found tubercles and tubercular-like ulcers over the entire length, and the histological appearance was that of tuberculosis. Adding to these the cases of Spillmann⁵ and Frerichs⁶ quoted by Flexner, of which Frerichs seems especially probable, we reach the stage when the existence of tuberculosis of the œsophagus was fully demonstrated by Weichselbaum⁷ by his discovery of the presence of the bacilli in his case, which showed the following conditions: tubercular enlargement of the supraclavicular and mediastinal glands, a moderate degree of tuberculosis of both lungs, and a few ulcers in the ileum. Three finger-breadths above the bifurcation of the trachea there were four minute openings in the trachea and eight in the œsophagus. These communicated with purulent glands between the trachea and œsophagus; above and below this, down to the cardia, there were myriads of small tubercles, gray or cheesy, and many tipped with small ulcerations. Two more were reported by Beck⁸ of generalized tuberculosis, with involvement of the œsophagus, in one of which it apparently extended from

¹ Kraus: Allgemeine med. Zeitung, 1869, n. 19.

² Breus: loc. cit.

³ Peter: Leçons de clinique Médicale, 1879, t. ii.

⁴ Eppinger: loc. cit.

⁵ Spillmann (quoted by Flexner): De la tuberculisation du tube digestive. These, Paris, 1878, p. 97.

⁶ Frerichs (quoted by Flexner): Beiträge zur Lehre v. d. tuberculose, 1882.

⁷ Weichselbaum: Wiener med. Wochens., 1884.

⁸ Beck: Prager med. Wochens., September 27, 1884.

the pharynx. These were fully verified. Carstens¹ makes the doubtful and unproved statement that there are in the post-mortem records at Kiel three undoubted cases of tuberculosis of the pharynx and two more that are probably such. Mazzotti² examined three cases, one of miliary tuberculosis with miliary tubercles in the oesophagus, one of advanced tuberculosis of the lungs with ulceration low down in the oesophagus and tubercles higher up, and a third, likewise of advanced pulmonary phthisis, with added intestinal tuberculosis. Here the oesophageal disease was in the form of a ring of elevated tissue of about three-quarters of an inch in diameter. Below this were a number of fine swellings. In all three cases he found tubercle-bacilli and the appearances of tubercular disease under the microscope.

To these must be added the three cases which Orth³ mentions, in two of which the diagnosis was completed by the discovery of the bacilli and the third presented all the histological appearances of tuberculosis, and the case of Birch-Hirschfeld, previously cited. Flexner⁴ added a case in which there was the interesting clinical observation that in washing out the pleural cavity, after resection of a rib for pyopneumothorax, portions of previously ingested food came away in the washings. Post mortem he found tuberculosis of the cervical and bronchial glands, tubercular pleurisy with pyopneumothorax, gangrene of the pleura, and intestinal tuberculosis of recent origin. In the oesophagus were found a large perforation into the pleura through one ulcer and another ulcer which reached only to the muscular coat. The edges and bases were smooth. Living maggots were found in the ulcers. Histologically, the non-perforating ulcer had undermined the mucous membrane and submucosa, which were lined with a layer of epithelium extending onto its base. In this projection in the base of the ulcer and in the smooth muscular fibres there were masses of epithelioid and lymphatic cells with some giant-cells. In the perforating ulcer likewise were tubercles found. The bacteriological examination was confirmatory. Zenker's⁵ three cases were reported recently. In the first the diagnosis had been made during life from dysphagia occurring in a case of pulmonary tuberculosis, with enlarged glands in the neck and with subsequent extreme pain on swallowing, radiating toward the ears. The sound met an impassable obstruction 22 cm. from the teeth. Post mortem there were in the lungs all stages of tuberculosis, with cavities in the apices. The oesophagus was stenosed from the level of the cricoid for 4 cm. downward, admitting only the finger-tip. There was within this a ring-like ulcer encircling the whole circumference, the edges of

¹ Carstens. *Beiträge z. Lehre u. Statistik der Oesophagusgeschwüre*. Inaug. Diss., Kiel, 1887.

² Mazzotti. *Rivista clinica*, Januar, 1885.

³ *Op. cit.*

⁴ Flexner. *Johns Hopkins Hospital Bulletin*, 1893, No. 28.

⁵ Zenker, K. *Deut. Archiv f. klin. Med.*, Bd. Iv., 1895, Festschrift.

which were irregular, warty, and somewhat undermined. The base seemed cicatricial tissue. It was very tightly adherent to the last three cervical vertebrae, and the tissue here looked exactly like scar-tissue. The ulcer involved only the mucous membrane. In the middle of the œsophagus was a swelling the size of a bean, discharging thin pus.

Under the microscope, surrounding the ulcer the epithelium was much thickened, and there were prolongations running out into the mucous membrane, but never reaching beyond it—the same picture as in lupus of the skin. At the beginning of the ulcer itself the epithelial covering ceased and there was round-cell infiltration, with occasional epithelial tongues left from the destruction of the mucous membrane. The whole was filled with round-cell infiltration in which there were many tubercles, which were especially characteristic in the base of the ulcer. Many contained numerous giant-cells which were mostly of lymphoid tissue; many others were largely made up of epithelioid cells. Some others were small necrotic masses. Both in the tubercles and granulations were many tubercle-bacilli, sometimes in great numbers, and especially on the surface of the ulcer. They were often enclosed in the cells. The process was localized to the mucosa and sub-mucosa, though there was a little round-cell infiltration of the muscular layer. The purulent swelling was a tubercular mass.

In connection with his previously mentioned emphasis of the causative part played by traumatism, he reminds us that the part here affected is especially liable to injury from its situation just back of the cricoid.

His second case presented no œsophageal symptoms, and was accidentally discovered. There was advanced tuberculosis of the lungs, trachea, larynx, and intestines. Opposite the bifurcation of the trachea was a slight narrowing of the œsophagus, and at this point there was a prominence with an ulcer the size of a finger-nail at its top. Surrounding this were small, yellowish masses. The whole thickness of the swelling was filled with caseous matter and tubercles were seen at a little distance. Enlarged and infiltrated bronchial glands surrounded it, and the process was evidently due to an extension from them. The further examination showed typical tubercles and tubercle-bacilli in large number.

In the third case the lungs, pleura, and intestines were tuberculous and there was a mass of tubercular glands in the neck. Three perforations existed in the œsophagus near its central portion, communicating with the bronchi and trachea. About these the mucous membrane was infiltrated and yellow. The tissue here was full of tubercles, necrotic granulation-tissue, and tubercle-bacilli.

Fränkel¹ published a case not long since of a man dying of pul-

¹ Fränkel: Münch. med. Wochensch., 1896, n. 2.

monary and intestinal tuberculosis, in whose oesophagus were many tubercles, some superficially eroded, and a large number of small ulcers. The microscopic appearance was that of tuberculosis, with occasional cheesy degeneration, in all tissues down to the muscular layer. Giant-cells and tubercle-bacilli were present in small numbers.

Glockner¹ has given a description of a rare localization of the process, the muscular layer only being affected; and Daniel,² most recently, examined the organs of a woman aged seventy-six years, confirming a clinical diagnosis of pulmonary tuberculosis with broncho-pneumonia, and finding also an ulceration, nearly four inches in length, of the posterior wall of the oesophagus, with excavated base, which was eroded and of reddish color. At its margin and in the neighborhood were many miliary granulations. Like granulations of less number were present on the anterior wall up to near the pharynx. At the crossing of the right bronchus was a circular opening, almost 1 cm. in diameter, communicating with a cavity formed by a broken-down and discharging peribronchial gland. The stomach was dilated, its mucous membrane slate-colored, and it contained numerous granulations of apparently tuberculous nature.

Further, the case published by Heryng³ in 1892 of "tuberculosis of the oesophagus resulting in recovery" is of interest, but inability to procure an abstract in a familiar language prevented examination of the diagnosis, which must have been very insecure without a study of possible removed portions.

Of those cases described, none before Breus give sufficient evidence of their nature for acceptance as diagnosticated. To add to the errors possible, there are cases of sarcoma of the oesophagus reported by Miller,⁴ Rolleston,⁵ Chapman,⁶ Oppenheimer,⁷ Ogle,⁸ Targett,⁹ and Shaw,¹⁰ among which the last two are of especial interest. Targett's exhibited an extensive and advanced tuberculosis of the lungs and a marked thickening of the oesophageal wall for several inches, the surface of this thickening being ulcerated; while Shaw's was likewise an ulcer beginning one inch below the cricoid and extending downward for three inches. In both cases the microscope showed sarcoma, chiefly of round-cells.

With Breus the security of the diagnosis becomes, it seems to us, sufficient for its acceptance, and certainly in all the cases subsequent to

¹ Glockner: *Prag. med. Wochensch.*, 1896, n. 11-13.

² Daniel: *Journ. de Sciences médicale de Lille*, 1896, n. 22, p. 530.

³ Heryng: *Gaz. lek. Warszawa*, 1892, 2, S. xii., 678.

⁴ Miller: *Trans. Med. Soc. of Pennsylvania*, 1881.

⁵ Rolleston: *Trans. Path. Soc. of London*, vol. 41, p. 65.

⁶ Chapman (quoted by Butlin: "Carcinoma and Sarcoma," p. 160).

⁷ Oppenheimer: *Louisville Med. News*, 1879, vii. p. 74.

⁸ Ogle: *British Med. Journ.*, March 31, 1896.

⁹ Targett: *Trans. Path. Soc. of London*, vol. 40, p. 76.

¹⁰ Shaw: *Ibid.*, vol. 42, p. 90.

his, with the exception of those of Spillmann, Frerichs, and Peter. The two latter, in the apparent lack of microscopical examination, must be considered doubtful. The original report by Spillmann has not been accessible to us, but from Flexner's description there would seem to be much doubt of its nature.

Certain other cases, such as those described by Vigla,¹ Löschner,² Uhde,³ Voelcker,⁴ Zenker,⁵ Pitt,⁶ and Penzoldt,⁷ in which there was perforation of the œsophagus, caused, except in Vigla's case, by abscesses of probable tubercular origin, can scarcely be considered because of the lack of description of any gross or microscopic lesions pointing to tuberculosis, but that there was tubercular infiltration of the wall in some of these cases is almost indubitable. As to the diagnostic significance of the examination of these cases there is little to be said. If a case of phthisis exhibit painful deglutition, and especially with evidence of some stenosis, a suspicion of tuberculosis of the œsophagus would be aroused, and the not infrequent occurrence of the disease at the uppermost portion of the gullet would point to the use of the laryngoscope as an aid, as in our case, in the establishment of a clinical diagnosis. Stenosis is not common, however, as beyond our report only those of Paulicki, Spillmann, and Zenker (in his first case) contain any description of it in distinct degree due apparently to the tubercular process, unless Mangetus's ancient but interesting case be seriously considered in this connection. This latter seems to offer the only marked parallel to ours in mechanical results from any cause. A goodly number of very extreme cases of stenosis may be found, as in Schomaker's,⁸ where there was in a boy of nine years a stenosis two inches in length admitting only a pin, the walls of the œsophagus being much thickened by scar-tissue; and in Shaw's,⁹ where a squamous epithelioma shaped like a flattened cone two and one-half inches in length, ragged and sloughing at its free border, choked up the whole lumen. Veggia¹⁰ had a patient whose œsophagus was so narrowed that she had to be nourished by the rectum. Post-mortem examination showed a hard, fibrous ring at the cardia that admitted only a No. 1 sound.

Pollock¹¹ quotes a case of Liston's, of external stenosis of the pharynx, in which there were an approximation of the upper horns of the thyroid

¹ Vigla : *Union Médicale*, 1855, p. 290.

² Löschner : *Virchow's Jahresbericht*, 1868, ii. S. 643.

³ Uhde : *Deutsche klinik*, 1856, n. 3.

⁴ Voelcker : *Trans. Path. Soc. of London*, vol. 42, p. 87.

⁵ Zenker : *v. Ziemssen's Handbuch d. Spec. Pathologie u. Therapie*, Bd. vii., Th. 1., Anhang, p. 187.

⁶ Pitt : *Trans. Path. Soc. of London*, vol. 39.

⁷ Penzoldt : *Virchow's Archiv*, Bd. lxxxiii., p. 488.

⁸ Schomaker : *St. Petersburger med. Wochensch.*, 1889, n. f. vi. p. 116.

⁹ Shaw : *Trans. Path. Soc. of London*, vol. 42, p. 89.

¹⁰ Veggia : *Gazetta medica di Torino*, 1889, p. 385.

¹¹ Pollock : *Holmes's System of Surgery*, 2d ed., vol. iv. p. 491.

and great hypertrophy of the constrictions of the pharynx, the stenosis allowing only the passage of a goose-quill. The patient had been under Cruikshank and John Hunter and treated for a long time, and died at nearly eighty years of age. Harvey¹ published an interesting report of stenosis that would admit only a No. 2 urethral bougie, which was caused by drinking concentrated sulphuric acid forty years before, and was practically cured by treatment.

Roe² had a case of fibroid stricture in which the lumen was of the size of a small lead-pencil, and quotes Poncet,³ who had described a stenosis admitting only a very fine probe, the cause of which was hypertrophy of the muscular layer. Not many other cases of such extreme degree of obstruction have been published, and this is not surprising, since the disease, if cancer, and the interference with the nourishment of the patient, are usually sufficient to cause death before this grade is reached.

The conditions found in our case under the microscope have, further, an interesting connection with the question of the relation of cancer and tuberculosis in the same organism, and especially that question of the relation between stenosis of the œsophagus, usually cancerous, and tuberculosis.

Rokitansky's original contention, in which he was followed by the Viennese school, that the two diseases were antagonistic, soon brought forth an answer from Lebert,⁴ who insisted that even the opposite was true, and he especially emphasized the view that tubercular subjects have an actual predisposition to cancer of the œsophagus. Behier⁵ was quite as vehement in expressing the same view. Hamburger⁶ and Fritzsche followed this opinion, and Hamburger even believed any chronic affection of the œsophagus in a tubercular subject should be always very suggestive of cancer. In the light of the cases of tuberculosis of this organ that have been considered, and after examination of statistics, this latter view is entirely untenable.

It has been the province, however, of numerous French writers to defend the view that tuberculosis occurs with especial frequency in stenosis of the œsophagus from any cause, the usual cause being, of course, cancer. Peter⁷ was convinced of this, and relates four of his own cases, one of which was not examined post mortem, but had stenosis of the œsophagus with clinical signs of phthisis. Another, with a fibrous stricture, showed post mortem recent miliary tubercles. The third had

¹ Harvey: Birmingham Med. Review, 1889, p. 225.

² Roe: New York Medical Journal, March 14, 1891.

³ Poncet (quoted by Roe): Bull. Méd., Paris, 1888, II. 451.

⁴ Lebert: Traité pratique des maladies cancéreuses, 1851.

⁵ Behier: Clinique médicale, 1861.

⁶ Hamburger: Medizin. Jahrbuch, 1869, n. 18.

⁷ Peter: Leçons de clinique médicale, 1879, I. II.

cancer, and at the apices of the lungs were granulations that appeared tubercular. The fourth case was the one previously mentioned under tuberculosis of the œsophagus. He further refers to a case of Gallard's, where there was cancer of the stomach and œsophagus, with pulmonary tuberculosis, and says he has seen tuberculosis in each case of fibrous or cancerous stricture he has observed. The cause of this supposed frequency he finds not in a particular effect of cancer itself in this situation, but in the inanition resulting from the insufficient nourishment possible in such cases, and refers to v. Jaksch's not very convincing statistics of tuberculosis combined with gastric ulcer as materially reinforcing this belief.

Letulle¹ and Leroux² reported cases of carcinoma with tuberculosis, and Leroux affirms that this evidences the possibility of a cancerous individual becoming tuberculous, but doubts the opposite, though an example of the latter is shown in Letulle's case in the same number of the journal. Michaux³ had a case similar to Leroux's.

Porchaire⁴ examined the records of the Anatomical Society of Paris from 1870 to 1880 and found twenty cases of cancer of the œsophagus, nine of which showed tuberculosis, in one case of the testicle alone, in another the process was old and healed; of two cases of cicatricial stricture one subject was tuberculous. He himself reports the case of a man, sixty-one years of age, who had developed upon the symptoms of carcinoma of the œsophagus those of pulmonary and, finally, general tuberculosis. The autopsy showed tubercles in the lungs, kidneys, spleen, and membranes of the brain, and a carcinoma of the œsophagus. Tissier⁵ likewise agrees with Lebert and Behier that the frequency is great, and adduced, as an example, his case previously described in this paper; and, finally, Parmentier⁶ had a case of cylindrical-celled cancer of the œsophagus in which there were both old and recent tuberculosis. In Michaux's case only is a microscopical examination of the tubercular condition mentioned, and this was not complete, but most of the cases had fairly complete macroscopic evidence of their nature. Opposed to these cases are the statistics published by Petri,⁷ who found tuberculosis in but four out of twenty-four cases of carcinoma. Lubarsch's⁸ statistics are much more favorable to the French view, including forty-seven cases of cancer of the œsophagus, of which eleven showed lesions of tuberculosis as well. When it is considered, however, that he insists,

¹ Letulle : Bull. de la Soc. Anat. de Paris, 1877, lii.

² Leroux : Ibid.

³ Michaux : Ibid., 1879, liv.

⁴ Porchaire : Tuberculose consécutive au rétrécissement cancéreux de l'œsophage. Thèse, Paris, 1883.

⁵ Tissier : Annales des maladies des l'oreille, du larynx, du nez et du pharynx, Nov. 1887.

⁶ Parmentier : Archiv. général de méd., 1889, i. p. 470.

⁷ Petri : Krebs d. Spaiseröhre. Diss., Berlin, 1868.

⁸ Lubarsch : Virchow's Archiv, Bd. cxi. S. 280.

and justly so, that all tubercular lesions, wherever situated, must be included, and not alone those of the lungs, as many had previously done in considering this question, it must be admitted that even this percentage of 23.4 would indicate rather its rarity than the opposite.

Hence, as far as statistics may be followed, there seems no causal relation on this point, though Peter's suggestion of the provocation of tuberculosis by the insufficiency of nourishment is certainly one that must have a positive bearing upon the question, and, in our case, the tuberculosis seems to have been regenerated in this way.

In the wider question of the relation of the two diseases in general, the original dictum of Rokitsansky has disappeared from the argument, and the greater tendency now is to a magnification of the *role* of local tuberculosis in the causation of cancer. Ribbert¹ takes the most extreme view on this point, and would make the causal relation a very intimate one. He holds, first, that the origin of cancer is due to the early proliferation of the connective tissue and its growth into the epithelial layers, finally cutting off portions of the epithelial cells, rather than to the primary growth of the epithelium itself. He supports this with the statement that Koster told him he had frequently found tuberculosis in malignant tumors of the chin, lower lip, and breast (but that they had never been carefully examined owing to the carelessness of an assistant), and with the description of eleven cases which he had examined, which showed typical cancer alveole in a tissue much infiltrated with round-cells and containing many or fewer giant-cells in the different cases. While the round-cells were occasionally collected into tubercle-like aggregations, in some cases they were not. In two of the cases the cancerous infiltration was but slight, while the tuberculosis—if such—was already well advanced. The descriptions are, however, solely of the local condition and are by no means convincing of the existence of tuberculosis there, and bacilli were not found in any case. As Clement² points out, the condition would strongly suggest a "foreign-body tuberculosis."

The more general view is to consider a local tuberculosis as predisposing to cancer in the same way that other sources of chronic irritation are known to do this, as the frequent pipe-smoker's cancer of the lip and the scrotal cancer of the chimney-sweep, or, more to the point, those that occur on the site of the chronic leg ulcers. Cordua and Zenker, as mentioned, have reported cases of the two combined in oesophageal ulcerations, in which as in Lubarsch's³ case, occurring in the ileum, and in Baumgarten's,⁴ of the rectum, the tuberculosis was

¹Ribbert: Munch. med. Wochensh., 1894, n. 17.

²Clement: Virchow's Archiv, 164: 139.

³Lubarsch: loc. cit.

⁴Baumgarten: Centralbl. f. Bacteriologie u. Parasitenkunde, 1894, xv.

apparently secondary to the carcinoma, and Clement¹ noted the frequency of tuberculosis in certain parts—especially certain lymphatic glands, as in the axilla—when carcinoma existed near by, while these same structures are usually rarely affected. But Crone² and Baumgarten³ have reported quite typical chronic tuberculosis of the larynx with secondary carcinoma in the same tissue, and Hildebrand⁴ a case of primary sarcoma of the lung and one of primary carcinoma of the same organ, in both of which the growths were situated near tubercular lesions, and, he thought, probably caused by them.

It is in *lupus vulgaris*, however, that this combination has been most frequently met with, and many men would make lupus a much more specific cause of cancer than the simple forms of inflammation, because of the peculiar form of interpapillary growths of the epithelium which may extend well into the subjacent tissues, even as far as the bone, according to Busch, and may show great numbers of pearly bodies, while the clinical cause remains entirely non-malignant. It is only when the ingrowths lose their limiting-membrane and form atypical nests that malignancy is developed, and this even does not seem always to determine the nature of the disease, so that Bayha⁵ would make the diagnosis in these intermediate cases depend more upon the clinical course than upon their histological character. He quotes cases described by Lang and Kaposi as similar to one of his own, and gives an interesting description of the latter; those portions of the tissues which were not cancerous, but in the immediate neighborhood of the cancer, showed most prominently an extreme change of the papillæ. They were markedly enlarged, partly long and narrow, like intestinal villi, partly broad and rounded. There was much round-cell infiltration, and here and there clusters of these cells which were often divided off from their surroundings by spindle-cells. The corium was much thickened and in the deeper parts the diffuse infiltration ended, and there were here many small masses of round-cells of irregular shape, and these especially accompanied the vessels. The epithelium showed great atypical growth, the cells in the heavy layer being particularly so much increased that they filled nearly all the spaces between the overgrown papillæ, and, as these latter often touched at their ends, there appeared isolated epithelial masses. Some small, sharply bounded epithelial prolongations reached deeply into the parts of the corium, showing the lupus-infiltration. There was a great tendency everywhere to form pearly bodies.

In the cancerous parts there was a suggestion in spots only of typical

¹ Clement: *loc. cit.*

² Crone: *Centralbl. f. Bacteriologie u. Parasitenheilkunde*, 1894, xv. p. 377.

³ Baumgarten: *Arbeiten aus dem Pathologisch-Institut zu Tübingen*, Bd. ii. Heft 1.

⁴ Hildebrand: *Zwei Fälle v. primär. malignen Lungentumoren im ausschuss an Lungentuberculose*. Inaug. Diss., Marburg, 1887.

⁵ Bayha: *Beiträge zur klin. Chir.*, Bd. iii. Heft 1.

epithelium. There were many typical cancer-nests and prolongations both in the superficial and deep parts, the remaining tissue being infiltrated diffusely with round-cells and tubercles, and in places he found, he thought, evidence of the direct replacement of the tubercles by cancer-nests; in some parts he saw a few epithelial cells scattered through a tubercle; again, a typical nest forming in the centre of a tubercle; elsewhere masses of round-cells, cancer-cells, and granular debris from cell-destruction. Extending to these collections were prolongations from cancerous nests. This description is very like some of the appearances seen in the sections from our case, in the portions that are cancerous, the epithelial prolongations communicating with aggregations of epithelial cells—sometimes but few in number, often a small nest, and, again, quite well-formed, large alveole, and often in these nests shapeless material that looks like degenerated cells; and these epithelial cells, in whatever form, are frequently surrounded by an especially thick collection of round-cells, often appearing much like a well-limited original tubercle. It is difficult to convince one's self, however, that this appearance is not caused by the irritation of the newly forming cancer-nests rather than by pre-existing tubercles which are succumbing to the advancing malignant disease.

Bidault¹ held, however, much the same view, maintaining that cancer may arise from lupus-scars or from a florid and advancing case; and Raymond² followed him, collecting fourteen cases, three of which were his own, in which cancer arose from a florid lupus; while Nithak³ compiled thirty-two cases arising from the active disease. These figures are, however, much damaged by the claim of many others and Bidault's own admission that there exists some scar-tissue in any case of lupus, and from this might arise a cancer that seemed to appear on the basis of actively inflamed tissue. There seems, in consideration of the vast number of cases of lupus that have been under careful observers without mention of malignancy, no reasonable ground for believing that even lupus, the most favored subject for this contention, causes any especial tendency of its own to cancer. It certainly does act as the starting-point of malignant growth, but all published knowledge would tend toward keeping it in the general class of chronic irritants.

Lubarsch⁴ has recently investigated the statistics of the general question of the lesions of the two diseases in the same individual, and again considers those of Cohen, who found but one combination in fifty cases of phthisis and thirty of cancer; Sandu-Miclesco, whose figures reached

¹ Bidault: Du lupus compliqué de l'épithéliom. Thèse, Lille.

² Raymond: *Annal. du dermatol.*, Bd. VIII. Heft 3.

³ Nithak: *Beiträge z. Lehre vom Carcinom.* Dissert., Marburg, 1887.

⁴ Lubarsch: *Ergebnisse der allgemeinen Pathologischen morphologie und Physiologie*, 1895, p. 166.

but 9 per cent.; Rapok, with thirty-nine tubercular in 399 cancerous; and others, who did not include tubercular lesions existing anywhere, were incorrect. He collected 569 cases of cancer, and investigating on this basis he found 117 tubercular—*i. e.*, 20.6 per cent. This makes his figures again look large; but he himself contradicts this by further stating that in his records there were 3.7 per cent. more tubercular who were non-cancerous than among those who were cancerous; and, on the other hand, 1.05 per cent. more cancerous among those who were not tubercular than among those showing lesions of tuberculosis. There is thus evidence that the two diatheses are unfavorable, each to the other, though the degree is slight and does not by any means amount to the original idea of Rokitansky of an antagonism. Lubarsch adduces figures and examples to prove that age is not the factor responsible for this, and suggests that more intimate study of the blood may make clearer the relations the diseases bear to each other. He makes a very lucid classification of their combinations, as follows:

CLASS I.—The tuberculosis is healed and the cancer has appeared subsequently. This is purely chance, and there is no actual relation.

CLASS II.—There are both old and recent tubercular lesions. Here the cancerous cachexia has probably produced a favorable soil for the tubercle-bacilli that have remained from the former struggle.

CLASS III.—To a cancer in active progress fresh tubercular lesions are added. This is but a rare and unimportant condition.

CLASS IV.—Cancer and tuberculosis proceed simultaneously. This is also very rare, and he considers the tuberculosis in such cases as predisposing to cancer by lessening the physiological resisting-powers.

Our case is difficult to place in this classification, however, and is excluded by the existence of the tuberculosis of the oesophagus in addition to his pulmonary lesions. The ancient tuberculosis, of course, played no active part in the etiology of the cancer; while the recent tubercular lesions almost certainly existed in part for many months previously to his death, while the carcinoma was of later origin. The pathological history would seem to be a local tuberculosis of the oesophagus, from the chronic irritation of which arose the cancer, and in this latter the added lowering of his resistance by the pulmonary tuberculosis lent its aid.

THE HYSTERICAL NEUROSES OF THE SKIN.

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"It is important," says Charcot, "to realize that hysteria has its laws, its determinism, exactly the same as a nervous affection with a material lesion. Its anatomical lesion still escapes our methods of investigation, but it betrays itself in an undeniable manner to the attentive observer by trophic troubles analogous to those seen in the case of organic lesions of the central nervous system or of its peripheral nerves."

It is to some of these trophic troubles that I wish to call attention in the present paper.

The chief affections of the skin which have been described as occurring in the course of hysteria are the following: *erythema*, *dermatitis*, *urticaria* (including *dermographism*), *hyperidrosis*, *oedema*, *urticaria bullorum*, *pemphigus*, *herpes zoster*, *eczema*, *gangrene*, *pigmentation*, *vitiligo*, *lichen*, *chromidrosis*, *ecchymosis*, *hamatidrosis*.

A brief description of some of the more salient characteristics of these affections is all that I shall give at the present time. I may say that, scanty as the descriptions may seem, they are based upon an extensive gleanings of the published literature of the subject, references to which are appended. My object is to give an extended view of the entire subject and of the relations of the various affections to one another, rather than to give a complete clinical picture of each one.

Erythema is one of the commoner forms of hysterical neurosis of the skin. It may form the origin or base of several other forms of eruption. The eruption of hysterical erythema presents in general nothing to distinguish it from the ordinary erythemata. In many cases, however, it tends to develop and change its character into that of a dermatitis, an urticaria, a purpura, or a gangrene. In a case reported by Schwimmer¹ the lesions of erythema occurring about the ankles became infiltrated with slight extravasations of blood, so that they resembled contusions.

In other cases a slight amount of effusion takes place, loosening the epidermis and causing the appearance of a flaccid bleb, or permitting the epidermis to be pushed or rubbed partly off the corium, leaving a highly characteristic abraded surface. This is the "neurotic excoriation" of Erasmus Wilson. In some cases the inflammatory character seems graded on the original lesion either as the result of rubbing and scratching, or of the introduction of staphylococci.

As these cases show themselves, various secondary lesions are present, sometimes rendering the diagnosis difficult. Feigning is often suspected

¹ Die Neuropathischen Dermatosen, Wien, 1883, p. 91.

under these circumstances. A case reported by Dr. Stelwagon¹ some years ago was supposed to have been feigned. Here the patient displayed elongated crusted patches with slightly inflammatory borders coming out in successive crops. The discomfort caused by the eruption, or the morbid sensation preceding it, caused the patient to rub the skin and thus engraft a new process upon the original dermatoneurosis.

A careful comparison of such cases, where the eruption is supposed to be feigned, with others, where all possibility of deception has been excluded, will show identical symptoms in each instance, exception only being made as regards the subsequent irritation caused by applications consciously or unconsciously made.²

Urticaria is one of the more usual forms of eruption met with in the hysterical condition, and is, in fact, the first symptom of many of the other skin-lesions into which it develops. When simple and uncomplicated it does not differ greatly from ordinary urticaria in appearance. Sometimes a violent emotion, as anger, or a nervous shock, as in a railroad accident, may lead to an outbreak of the eruption. Similar outbreaks may, however, occur in persons of a neurotic temperament with a predisposition to hysteria, and may in many cases be hysterical in origin. Urticaria is the basis of some of the more severe forms of hysterical skin-disease, and we often find cases reported as "urticaria with bullous efflorescence," "urticaria hemorrhagica," and "urticaria gangrenosa." These forms will be described a little later.³

Closely allied to urticaria is the peculiar condition named by Barthelémy, in his admirable monograph upon the subject,⁴ *Dermographism*, but also known as *autographism*, *factitious urticaria*, etc.

Dermographism is the property sometimes assumed by the skin of preserving, in an enlarged and more or less permanent form, any marks which may be made upon it. To produce such a lesion in the normal state intense and prolonged pressure, as of a tightened cord, is required, and even this produces a merely transitory and non-elevated mark. In the condition of dermatographism simple contact with a smooth instrument or with the edge of the finger-nail produces an intense, persistent

¹ A Case of Feigned Eruption. Archives of Dermatology, 1882, vol. viii. p. 236.

² The following papers have been referred to in connection with hysterical erythema and dermatitis:

Bowen. Boston Medical and Surgical Journal, January 26, 1890.

Bronson. Journal of Cutaneous and Genito-urinary Diseases, June, 1890.

Edebohls. New York Journal of Gynecology and Obstetrics.

Flower. British Medical Journal, 1870, vol. i. p. 307.

Hyde. International Medical Magazine, June, 1892.

Martin. Des Troubles de l'appareil vaso-moteur dans l'hystérie. Thèse de Paris, 1876.

Bulkeley. Archives of Dermatology, 1880, vol. vi. p. 257.

Edwards. Quelques faits de Suggestion. Le Progrès Méd., 1890, No. 25, p. 500.

Fortner. Lancet, August 25, 1883.

³ A typical case is that of Thompson ("A Case of Factitious Urticaria." Lancet, 1893, vol. i. p. 924).

⁴ Etude sur le Dermographisme. Paris, 1893. (Contains a very copious bibliography.)

elevation more or less discolored in rose or white. In hysteria dermatographism and urticaria may coexist, but, although arising from a common cause, they are perfectly independent of one another.

As the eruption is indolent, its existence is usually discovered by chance. Occasionally it is caused by some violent shock or emotion, or as the result of a nervous crisis; at other times it may ensue without any appreciable cause. The lesions may make their appearance after pressure with the fingers or the clothes. Sometimes an accurate pattern of a piece of lace is seen traced upon the skin. The impression of heat or cold often brings out the eruption, as washing the hands in cold water, or going out into the open air. In this the analogy to urticaria is evident.

There are several degrees of intensity of the affection. The mildest form shows itself as follows:

At a point where the skin has been irritated a white stria instantly appears, succeeded almost immediately afterward by a broader stripe of a deep rose color, perfectly flat, and on a level with the skin. This coloration lasts, as a usual thing, five to ten seconds, or half a minute at the most. When a distinct pathological condition exists, however, it may last fifteen to twenty-five minutes, and then it pales gradually and irregularly until it disappears.

In this mildest form dermatographism is familiar to all. We see it in cases of eczema, in persons subject to urticaria, and in all sorts of individuals who are suffering from alimentary autointoxications. It is in no way pathognomonic of hysteria.

The medium condition of dermatographism is characterized by a more pronounced appearance. The rose-colored line is bordered on either side by two narrow white bands, which disappear before the central one. The latter in its turn disappears in sinuous lines pinked out at the border, so that a number of rose-colored islets take the place of the band.

Barthelemy says that in analyzing the lesion above described we find the white lateral bands corresponding to a constrictive spasm of the vasomotors which determines a local anemia at this point. The rose-colored points result from a dilatation of the vasomotors and a stagnation of the blood; so that there are at first a spasm and contraction at the periphery of the lesion; then dilatation or paresis—or even paralysis—of the vasomotors at the centre. Then, when this sort of circulatory convulsion, a true vasomotor ataxia, has passed away, the normal course of the blood returns little by little, and the skin resumes its ordinary aspect.

The severe or intensive form of dermatographism as artificially developed begins like the milder form, but at the end of about four or five minutes the lesion has developed until it resembles a white cord or goose-quill under the skin, or even an enlarged and indurated vein. At the

end of half an hour, an hour, or several hours, a gradual inverse evolution sets in, following the same course as in the milder cases. Even after the lesion has disappeared to the eye, leaving only a diffuse redness, it can be felt under the finger, and a slight rubbing will bring out a renewed tracing of the original mark.

The duration of the lesion varies from an hour or two to several days.

While dermatographism is not necessarily hysterical in its origin any more than urticaria, yet the susceptibility to this eruption is one of the characteristics of that affection, and in those forms of hysteria which in former times were attributed to direct demoniacal influence dermatographism plays an important part.

Hyperidrosis is one of the symptoms of hysteria which has been known longest. Sydenham notes it as regards nocturnal sweating. The hyperidrosis of hysteria may be general or partial. When partial it is frequently superposed on other hysterical symptoms, being limited, for example, to the side affected in hemianæsthesia. In a case noted by Martin¹ night-sweats were present; but while the paralyzed side, which was atrophied, secreted only slightly, the unaffected side was streaming with perspiration. Martin says that such observations show us a sudoral hypersecretion joining itself to disturbances of sensation and motility limited to one side. But we cannot establish a certain relationship between any particular symptom and the hypersecretion of sweat, because not only are the two classes of phenomena not necessarily related, but we find the hyperidrosis showing itself now on the hemianæsthetic side, and now on the healthy side, the hemianæsthetic side remaining quite dry.

Fabre² says that hysterical hyperidrosis is less marked in some cases during the summer than it is in the winter.³

Edema is a very interesting symptom of hysteria. It has been described by Weir Mitchell,⁴ Chareot,⁵ and more recently by many others, and I shall not here dwell upon it at any length. It usually occurs in connection with other hysterical symptoms, as arthralgia, paralysis, or contraction. It is most commonly unilateral, although exceptions have been noted to this rule, and a generalized form has been described.

The appearance of the integument which may happen to be the seat of hysterical oedema varies. The color may be white, as in ordinary

¹ Des Troubles de l'appareil vaso-moteur dans l'hystérie. Thèse de Paris, 1876.

² L'hystérie viscérale. Paris, 1883, p. 96.

³ See also Comby. Hystérie larvée, Sueurs profuses des extrémités. Journ. de Méd. et de Chir. Prat., 1881, p. 344.

Sorbets. Hystérie, Froid glaciale, Sueurs profuses. Gaz. des Hôp., 1889, t. 62, p. 945.

⁴ The Unilateral Swelling of Hysterical Hemiplegia. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1884, vol. lxxxviii. p. 94.

⁵ L'œdème bleu des hystériques. Clinique des Mal. du Syst. Nerveux, 1892, t. i. p. 95.

dropsies; rose colored, or red; but most frequently it is bluish or violaceous. The color usually remains the same in a given individual whatever point may be attacked and in successive attacks.

Hysterical oedema is always hard; the pressure of the finger makes little or no impression. Punctures do not give exit to serum. Gilles de la Tourette says that it is a regular oedema invading the entire circumference of the member. There are exceptions to this, however. In one case a tumor the size of an egg, of a violaceous rose color, was found seated near the external malleolus of the left leg. Such cases, excepting where the history is clear, are with difficulty distinguished from the cases of so-called giant urticaria and acute circumscribed cutaneous oedema.

On palpation the sensation given by hysterical oedema varies. The temperature of the surface may be normal, or in blue oedema it may be diminished, while in rose-colored or red oedema it may be increased. In one case of oedema of the wrist, hand, and fingers the surface was 10° to 12° C. less than on the affected side. In such marked cases the skin is cold and dry, the color blue with violaceous marblings, and it may become almost black in color.

Sometimes the general tint may be rose-colored or red, the surface shining as in articular rheumatism, and giving the impression of an elevation of temperature, which may indeed be present to the extent of 1° to 2° C.

Hysterical oedema, whatever form it may take, is almost always accompanied by sensory troubles, often to a marked degree. Charcot has observed thermoanesthesia.

The course of hysterical oedema is variable. It appears with or preceding the contracture or paralysis, becomes established with the motor troubles, and undergoes frequent changes of increase and diminution. The latter is highly characteristic. The oedema increases or decreases under the influence of the appearance or disappearance of the menses, of strong emotion, etc.

The duration of the affection is very variable. It may last as long as two or even five years. Its gravity is measured by that of the accompanying general symptoms.

The diagnosis of hysterical oedema when this occurs in connection with other well-marked hysterical symptoms is usually not difficult. When the oedema is rose-colored and coexists with an arthralgia rheumatism is suggested. Brodie has noted, however, that the oedema is not exactly limited to the painful joint, but has a strong tendency to become diffused over the entire member and even in localities where the articulations are unaffected. In addition there is no fever in connection with the hysterical affection. Nevertheless, it has sometimes been taken for rheumatism.

In other cases hysterical oedema has been mistaken for phlegmasia alba

dolens, periostitis, syringomyelia, and Raynaud's disease. As regards the latter, similar symptoms sometimes occur in connection with hysteria.¹

Pemphigus. This form of hysterical dermatoneurosis has long been recognized, and the term "pemphigus hystericus" is familiar. The eruption takes on various aspects. The lesions may consist of phlyctenule, or of larger blebs, and it may occur alone, the bullæ rising directly from the skin without any perceptible base or areola, or they may develop from erythematous or urticarial patches. Their most frequent seat is upon the limbs, although any portion of the body may be attacked.

The lesions may be filled with serum, with serosanguinolent fluid, or, in rare cases, they may be semipurulent or purulent. Commonly the individual lesions run a rapid course, but the eruption is kept up by repeated outbreaks. Not infrequently each outbreak is connected with an hysterical attack, or in women with the recurrence of the menstrual period.

The bullæ of hysterical pemphigus may dry up and leave crusts which fall off without being followed by any mark, a pigment-stain may be left behind, or an ulcer may form at the base of the lesion and, healing, leave a keloidal scar.²

Herpes zoster. I am not sure that herpes zoster should be included among the hysterical neuroses. These, as I shall point out, seem to belong to the class of vasomotor affections, while herpes zoster, according to Vulpius,³ is not the result of direct vasomotor influence. Ferré,⁴

¹ See also Ashton, Thomas G. Angioneurotic Edema. Philadelphia Med. News, 1896.

Börner. Ueber nervöse Hautschwellungen als Begleiterscheinungen der Menstruation und des Klimax. Volkmann's Sammlung, 1888, No. 312.

Collins. Angioneurotic Edema. AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1892, No. 104, p. 654.

Gilles de la Tourette et Dutil. Contrib. à l'étude des troubles trophiques dans l'hystérie. Atrophie Musculaire et Edème. N. Iconog. de la Salpêtrière, 1889, vol. ii. p. 251.

McCosh. Hysterical Blue Edema. Annals of Surgery, 1893, vol. xviii. p. 667.

Shaw and Duryee. Hysterical Blue Edema. Brooklyn Med. Journ., 1893, vol. viii. p. 193.

Simon. Acute Angioneurotic Edema. Johns Hopkins Hospital Reports, August, 1891, No. 6, p. 339.

Thibierge. Un cas de l'œdème bleu hystérique. Bull. Soc. Franç. de Dermatol. et de Syph., 1892, vol. iii. p. 135.

² See also Neuman. Wien med. Jahrb., Monthly Abst., November, 1877, p. 506.

Brissaud. Eruption de pemphigus localisée à la moitié gauche du tronc chez une femme atteinte d'hémiplégie gauche (pemphigus zoster). Abeille Méd., 1879, vol. xxxvi. p. 473.

Susemehl. Deutsche Klinik, 1851, p. 87.

Mermer. Pemphigus dans les Neuroses. Thèse de Paris, 1877.

Pierrepoint. Sajous' Ann. Univ. Med. Sci., 1889, vol. iv. a. 62.

Pick. Ueber ein eigenthümlich Nervöse Hautaffect. bei ein Hysterische Blötsinnigen. Wiener med. Presse, 1880, Bd. xxi. p. 1830.

Neuberger. British Journal of Dermatology, February, 1893.

Murrell. Lancet, 1883, i. p. 447.

Kaposi. Pemphigus Neuroticus Hystericus. Wiener klin. Wochen., May 29, 1890.

Franceschi. Du Pemphigus chez les Hystérique. Thèse de Paris, 1883.

Duhring. Neurotraumatic Dermatitis Vesiculosum et Bullosum. International Medical Magazine, March, 1892.

Bondet. Lyon Méd., January 1, 1893.

Bayet. Bruxelles Journ. de Méd., March 5, 1891.

Agagneur. La France Méd., May 24, 1887.

³ Leçons sur les vaso-moteurs, t. ii. p. 556.

⁴ Zona hystérique. Archives de Neurologie, 1882, vol. iii. p. 167.

however, gives the case of an hysterical patient in whom herpes zoster undoubtedly occurred. Pains in the *left* side of the chest resembling pleurodynia were treated by a blister, which was followed by the development of a zone of sensibility around it. A few days later lancinating pains were felt in the *right* lumbo-abdominal region, starting from the dorso-lumbar hysterogenetic zone and following obliquely the direction of the intercostal nerves toward the anterior aspect of the abdomen. Two or three days later still a well-marked eruption of herpes zoster was observed in the same locality.

In this case the herpes zoster developed on the course of nerves having their origin on a level with the dorso-lumbar hysterogenetic zone. It should be remarked that during the period of the zoster eruption the patient was free from hysterical attacks. The hysterogenetic zone, according to Ferris's view, seemed to determine the localization of the zoster, and this latter seemed to exercise a suspensive action on the convulsive manifestations of hysteria.

The case stands alone, so far as I know, as an instance of true herpes zoster occurring in connection with hysteria. The other cases reported, as Kaposi's,¹ lack some of the characteristics of true herpes zoster, and seem to be rather cases of diffuse gangrenous patches without any arrangement along the lines of the nerves.

Eczema. It is a question in my mind whether the lesions described as hysterical eczema should not rather be included under the head of dermatitis. The reports of these cases are usually too vague to permit of exact discrimination, but those which are not in their inception erythematous are probably of a similar character to the changes in the nails with which they are occasionally accompanied. The eczematous outbreak may be local, as in a case where the eruption was confined to the lobe of one ear, recurring with each hysterical outbreak for a year, or in another instance where the attacks occurred in the flexures of the joints, and were accompanied by trophic changes in the nails. Sometimes the eczema occurs upon a basis of urticaria. Nicholski has observed twelve cases of chronic eczema accompanied by cutaneous anesthesia. The habitual location was the hand, and the eruption was usually symmetrical. In all these cases the eczema occurred in the anesthetic region.²

Gangrene. The occurrence of gangrene in connection with hysteria is not, comparatively speaking, uncommon. It may occur in several different forms, and is usually preceded by certain subjective symptoms, as tingling, itching, or darting pain.

¹ Archiv. f. Derm. u. Syph., 1889, Heft iv.

² See also Fabre, *loc. cit.*

Nicholski. Revue Neurologique, 1891, p. 628.

Oulmont and Touchard. La Médecine Moderne, February, 1891, Nos. 7, 8, 12, and 13.

Froche. Eruptions cutanées chez les Hystériques (eczémateux dermatitis). Journ. de Mal. cut. et Syph., 1896, p. 4.

The earliest lesion is at times an erythematous blush, or a papule; at other times an urticarial wheal, and occasionally a bulla. On the basis of this preliminary lesion a point or patch of necrosis forms, sometimes as a black eschar, at other times as a parchment-like induration, accompanied in some cases with a slight purpuric effusion. The eschar separates, leaving an ulcer, which may be extremely superficial and followed on healing by only a slight pigmentation, or which may be deeper and followed by a keloidal scar.

Any of the other lesions of hysteria on the skin may develop into gangrene.

The so called "herpes gangrenosus" of hysteria has nothing herpetic about it, but is a simple multiple gangrene. The lesions of hysterical gangrene of the skin may be single or very numerous, and vary in size from a pin-head to that of the palm of the hand. Any portion of the body may be attacked.

Several cases have been reported where gangrene has occurred following injuries to the skin, as burns, pricking the fingers with needles, etc., so that the question as to whether a transmitted neuritis or some reflex effect might not be involved. Such, however, is not considered likely.¹

¹ See also Allen. Journ. Cut. and Gen.-urin. Dis., June, 1890.

Arning. Münchener med. Wochen., 1888, No. 21. (AMERICAN JOURNAL OF THE MEDICAL SCIENCES, October, 1888.)

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Verrillot. Nouv. Iconog. de la Salpêtrière, September, 1895, p. 288.

Veillon. Troubles trophiques symét. des Mains, etc., d'origin prob. hystérique. Nouv. Iconog. de Salpêtrière, July and August, 1892, p. 201.

Yandell. Gangrenous pemphigus. Louisville Medical News, 1879, vol. viii. p. 211.

Pigmentation, vitiligo. Parrot¹ has published a number of cases showing the relationship between certain nervous and neuralgic disturbances, and the appearance of pigment-spots. He intimates some connection between pigmentary derangements and chromidrosis. Lebrun,² in his thesis, describes seven cases of vitiligo which appear to have been connected with hysteria, the appearance of the vitiliginous patches coinciding in some cases with the attacks.

Fabre³ says that the influence of hysteria in the production of pigmentary alterations is most manifest. He has frequently observed patches of pigmentation form upon the forehead and face in hysterical persons, similar in all respects to the mask of pregnant women, while the patients were neither pregnant, cachectic, nor suffering from uterine disease. In one case of hysteria Fabre observed a yellowish discoloration upon the right upper eyelid, a sort of xanthelasma. More frequently he has noted a blackish appearance over the skin, a variety of chromidrosis. This connection between chromidrosis and pigmentary alteration in the skin is a very curious one.⁴

Lichen planus. But few cases of lichen planus have been reported in connection with hysteria, and these are not altogether convincing as regards their true etiology. Feulard⁵ describes one case which presented the typical features of lichen planus, with the peculiarity that the lesions were distributed along the course of the median nerve. A second case assumed the generalized miliary form. The palmar and plantar surfaces showed characteristic lesions, and others appeared on the buccal mucous membrane, the tongue, and the lower lip.

Hallopeau-Larat, cited by Gilles de la Tourette (*l. c.*, p. 431), described a case in which patches of vitiligo were surrounded by numerous papules of lichen planus.

Chromidrosis. Lecat⁶ mentions the case of a woman in whom, as a consequence of some grief during pregnancy, an hysterical condition supervened. She became deeply pigmented all over the forehead, eyelids, and face, with hyperæsthesia of the affected parts. This condition was followed by black chromidrosis, disappearing at the end of term, but recurring during each succeeding pregnancy.

Billard⁷ gives the case of a girl of sixteen, of nervous constitution,

¹ Notes sur quelques pigmentations anormales de la peau. *Gaz. Hebdomadaire*, Fev. 1869, p. 116.

² Du Vitiligo d'origine nerveuse. Thesis de Lille, 1886.

³ L'hysterie viscérale. *Op. cit.*, p. 95.

⁴ See also Barbe, Hysterie et vitiligo a la suite d'une operation de Butey. *Ann. de Derm. et de Syph.* 1891, p. 457.

⁵ Hallopeau-Larat. Nouvelle variété de tropho-neurose caractérisée par des dischromies et éruptions lichénoides. Cited by Gilles de la Tourette. *Traité de l'hysterie*, II. Part. I. i. p. 431.

⁶ Lichen plan chez les hysteriques. *Ann. de Dermatol. et de Syph.* 1890, p. 872.

⁷ Traité de la couleur de la peau humaine. Amsterdam, 1765, p. 136.

⁸ Mémoire sur un cas particulier de cynopathie cutanée ou coloration bleu de la peau, causée par une altération de la transpiration. *Archiv. Gen. de Med.* 1831, t. xxvi, p. 453.

subject to a dry cough, with occasional hæmoptysis and hæmatemesis, and on one occasion a "neurosis" for six days, but without any physical signs of disease. The patient displayed on the face, the neck, and the upper part of the chest a bright blue color, which on examination was found to be the product of the sweat-glands. The coloration, which afterward spread over the front of the chest and abdomen, and later over the shoulders, arms, and part of the thighs, varied considerably in intensity at one time and another, depending on the circulation of the part. When suddenly addressed the girl's face became of a deeper tint. "She blushed blue instead of red," as Billard says. She perspired profusely at night.

Hysterical chromidrosis is usually black or blue. The symptoms are as follows:¹ without an appreciable cause, or more frequently under the influence of some menstrual disturbance, moral emotion, or intense heat, the lower eyelids, more frequently attacked than other regions, become swollen, congested, and painful, while a blackish or bluish patch of variable area shows itself, which at first is rather light in tint, but soon becomes darker, and spreads over the entire surface of the lid. In some cases the affection goes no further, but in many instances the cheeks and forehead, particularly the edge of the scalp, the nostrils, lips, ears, etc., may be invaded, and occasionally, as in Billard's case, described above, a considerable part of the surface may be invaded.

The appearances presented by the patches of disease are variously described. Sometimes the skin looks as if fine charcoal-powder had been dusted over it. In other cases, particularly when the attack is a mild one, I have observed an appearance of fine black points, looking like comedones, or as if a greasy skin had been subjected to the dust of railroad travel. Sometimes black lines are seen in the folds of the skin, as of the eyelids. Occasionally the skin looks as if it had been smeared with a mixture of grease and lampblack, and occasionally such has been the fact, for certainly some few cases of black chromidrosis have been artificially produced. I believe, however, that in such instances there has been a slight spontaneous condition of chromidrosis to act as an autosuggestion to the patient.

I have not space at present to do more than sketch the appearances presented in this very interesting cutaneous manifestation of hysteria. I have endeavored in another place² to describe the affection at greater length.³

Purpura. Ecchymosis. Hysterical ecchymoses are usually found in connection with purpura and hæmatidrosis. They may occur separately.

¹ Parrot. Article Chromidrose. Dictionnaire des Sci. Méd.

² Art. Chromidrosis. Twentieth Century Practice of Medicine, 1896, vol. v. p. 539.

³ See also Le Roy de Méricourt. Annales d'oculistique, 1863, t. 1. p. 5.

Deltil. Hysterical Chromidrosis. La France Méd., 1877, p. 186.

Fox, T. C. British Medical Journal, 1881, vol. i. p. 921.

however, and are probably far more common than the number of reported cases would seem to indicate. In Magnus Huss's well-known case of hematidrosis the patient after an hysterical attack, accompanied by hematemesis, showed ecchymoses and suggillations of greater or less size over the left side of the body, and particularly about the left shoulder. After the attacks the left arm and leg remained in a state of semi-paralysis. Between the attacks the patient suffered occasionally from left intercostal neuralgia.

A case of ecchymosis by suggestion is that reported by Brown-Séquard,¹ where a mother, seeing a window-frame fall suddenly upon her child, showed immediately afterward a large ecchymosis upon the corresponding part of her arm.

Of purpura, in the narrower sense, the case reported by Rendu² will serve as an example. It was that of a nervous young woman in whom, following a moral shock, an eruption of purpura showed itself chiefly upon the thighs and arms. Each patch of purpura was situated upon a large papular elevation somewhat resembling urticaria. There were also marked areas of local oedema accompanied by a feeling of tension and pain, and sometimes forming very suddenly at different points. There was also a constant hyperesthesia with sensations of cold.

Pincetta³ reports the case of a girl of eighteen, who had suffered for a year previously with attacks of hysterical convulsions. One morning, on rising, she presented a bluish-red coloration extending over the pinna of both ears, with slight tumefaction, occurring without appreciable cause, and without other premonitory symptoms than a slight sensation of heat lasting a few hours. The discoloration was accompanied by desquamation, and disappeared in about eight days.

Gilles de la Tourette⁴ records the case of a girl of nineteen years, of strong hysterical antecedents, who called his attention one morning to a small red patch on the internal tibial surface of the right side. On the previous evening she had had a weeping-spell, and during that night had experienced terrifying dreams. Toward morning she had felt a sharp pain on the internal surface of the right leg, and was much surprised on rising to discover, at the painful point, an ecchymosis 5 cm. in length by 3 cm. in breadth, oval, and with the long diameter vertical.

On examination right hemianesthesia was found to exist in the region involved by the ecchymosis. The lesion passed through the usual changes observed in similar cases, and at the end of some days had disappeared. The patient was certain that she had not received any injury

¹ Soc. de Biologie de Paris, 1855, 4 Juillet.

² Recherches sur les altérations de la sensibilité dans les affections de la peau. *Annales de Derm. et de Syph.*, 1871-75, t. VI, p. 138.

³ *Ann. de Derm. et de Syph.*, 1896, p. 419 (from *Riforma Medica*).

⁴ *Sony. Iconographie de la Salpêtrière*, 1890, vol. III, p. 19.

at the spot, and that it had been perfectly normal when she went to bed the night before; nor had she had convulsions through the night.

Hæmatidrosis. Hæmatidrosis, or bloody sweat, is one of the most striking manifestations of hysterical dermatoneurosis. Since the appearance of Parrot's monograph¹ this affection has been regarded as a neuropathic hemorrhage, and the cases which have been published from time to time when collated are found to be strictly dependent upon the hysterical condition.

I have elsewhere² given a full account of this affection, and shall, therefore, at present only touch upon its salient characteristics.

In some cases the exit of blood takes place from an apparently perfectly normal skin, but this is unusual. More commonly an erythematous patch, sometimes compared to a superficial burn, makes its appearance; the epidermis becomes raised as if a blister was forming, sometimes serous at first, in other cases bloody from the beginning. The blister breaks open and serum, pure or mixed with blood, flows at first, soon changing to pure blood. Sometimes the loosened epidermis seems to float off from the subjacent corium, leaving a raw, oozing surface covered with a dew of blood. Where the epidermis is thick, as on the palm or soles, a fissure opens from which the bleeding proceeds. When the blood oozes from the apparently normal skin it soon dries, and can be wiped away, leaving a normal or slightly pale surface beneath. When a bulla has formed the process is more severe. After the bleeding has ceased, which may occur at the end of a few hours, or only after a day or so, the crust usually dries up and undergoes involution as an ordinary blister, healing completely at the end of six to ten days. Sometimes the surface shows no trace of the lesion; at other times a pink tender spot, or a fissure if the epidermis is thick, remains. The latter is especially the case in the numerous recorded instances in which the wounds of the Crucifixion are imitated, the recurrences taking place in the hands, feet, side, and brow, week after week with perfect regularity. Now and then suppuration may take place, which delays the healing, but this is rare and accidental.

The general symptoms vary greatly, but are almost always of a highly hysterical character. Accesses of fury, attacks of lethargy, ecstasy, and the like usually precede the outbreak. Burning, stinging, and darting pains at the point to be attacked usually precede the appearance of the lesions.

Although in some cases a very considerable amount of blood may be lost, yet the patient usually enjoys fair health, or at least does not suffer from the loss of blood.

¹ Etude sur la sueur de Sang, et les Hemorrhagies Neuropathiques. Paris, 1859.

² Hæmatidrosis (bloody sweat). International Clinics, July, 1896, vol. ii. 6th ser.

Few of the hysterical dermatoneuroses present such a variety of appearances as hematidrosis. I have given an outline of the chief aspects presented, and the picture must be filled in by a perusal of the histories of individual cases. Many of these will be found by reference to the bibliography appended.¹

There are other forms of cutaneous disease which have been described

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- Bourruet Burot. Hémorrhagie de la peau provoquée par la suggestion en somnambulisme. Comptes Rend. de la Soc. de Biologie, 1885, 8th ser. t. ii. p. 401.
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- Huss. Archives Gén. de Méd., 1857, 5th ser., t. x. pp. 1-129.
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- Imbert-Gourbeyre. Bull. de l'Académie, 1879, 3d ser., t. ix. p. 265.
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- Labee. Le Mouvement Méd., September 5, 1877, p. 111.
- Lefebvre. Louise Lateau, 2d edition. Louvain, 1873.
- Mabille. Note sur les hémorrhagies cutanées par autosuggestion dans le Sommeil provoquée. Progres Medical, 1885, p. 155.
- Maugon. De l'Hématidrose. Thèse de Bordeaux, 1889.
- Maury. Les Mystiques Extatiques et les Stigmatisées. Annales Medico-Psychologiques, Paris, 1885, t. i. pp. 218, 219.
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- An Italian Louise Lateau. Lancet, 1876, vol. i. p. 557.

as occurring in connection with hysteria. These are *erythromelalgia*, *Raynaud's disease*, *ichthyosis*, *epithelial atrophy with rupia-like exudation of scales*, *phlegmonous swellings*, *pseudo elephantiasis*, *Morvan's disease*, *nodules*, *ulcers*, etc.

In addition certain trophic disorders of the appendages of the skin have been noted: *canities*, *alopecia*, *hypertrichosis*, *fissure of the hair*, together with *deformities* and *shedding of the nails*.

If now we set aside the last two groups and consider the forms of disease which I have sketched in outline, we find that they belong one and all to a certain category. They are not merely a fortuitous collection of skin diseases, but belong to a series of which the first member is erythema or dermatographism. A step further we find urticaria with oedema. Then, as another stage in the series, we have the vesicular and bullar formations, and, finally, gangrene. Side by side with these we have alterations in the pigmentary deposit of the skin, hyperidrosis, chromidrosis, and hæmatidrosis. I have described these affections separately; but the fact is that in many cases as reported several of these affections run one into another, beginning with one of the earlier members of the series and developing later into a more advanced manifestation. They all, however, belong to one and the same group—the vasomotor neuroses.

As regards the other forms of hysterical dermatoneuroses, erythromelalgia, Raynaud's disease, pseudo-elephantiasis, etc., these evidently belong to the same general category, or at least the vasomotor element is evident in them. The changes in the hair and nails cannot in the present state of our knowledge be brought under precisely the same head, but this, I think, is because we know so little about their true pathology.

It is a curious coincidence, and one which I think will go toward helping us in our future study of the dermatoneuroses in general, that the skin-lesions accompanying other affections of the nervous system are similar in their nature to those we have described above.

Thus Crocker¹ states that the eruptions which have been noticed in ataxy are: 1. Transitory erythema (*a*, simple; *b*, *nodosum*). 2. Urticaria. 3. Papular or lichenoid eruptions, probably eczematous. 4. Ordinary eczema. 5. Herpes zoster. 6. Pemphigus. 7. Pustules "like ecthyma." 8. Ulcers. 9. Superficial gangrene. 10. Perforating ulcer of the foot. 11. Falling off of the big toe-nail. 12. Leucoderma. 13. Petechiæ and Ecchymoses. 14. Unilateral sweating. 15. Oedema.

Cutaneous disease from lesions of the branch or branches of nerves below the ganglion have been described by Paget and by Mitchell, Morehouse, and Keen. The nutritive and other defects that have been

¹ Lesions of the Nervous System Etiologically Related to Cutaneous Diseases. Brain, 1881. p. 349.

recorded are, according to Crocker: 1. Erythema. 2. Herpes. 3. Bulke. 4. Ulcers. 5. Eczema. 6. Glossy skin. 7. Defects of nails. 8. Defects of hair. 9. Defects of pigment. 10. Chronic oedema, like elephantiasis. 11. Ichthyosis-like condition.

The fact that the dermatoneuroses resulting from organic disease so closely resemble in their nature those occurring in hysteria is of importance when we come to consider the question of the supposed factitious character of some of the hysterical eruptions.

Until within the last few years most of the hysterical dermatoneuroses were considered as belonging to the category of feigned diseases. The desire for sympathy, the morbid longing for notoriety, etc., were supposed to account for the artificial production of lesions in cases where this could be proved, and the same deduction was drawn in many cases where the self-infliction of skin-lesions could not be proved to have taken place.

We know now that the phenomenon of autosuggestion is one of those most conspicuous in the etiology of hysterical affections of all kinds, and we have sufficient data to assume autosuggestion to be at the bottom of the production of many of the dermatoneuroses of hysteria. Particularly in the numerous and carefully detailed histories of the stigmatics we can trace the working of autosuggestion most plainly.

Moreover, several most interesting experiments in suggestion have been successfully performed. Mabile suggested to an hysterical man, plunged in hypnotic slumber, that a quarter of an hour after he should awake the letter V would appear at a spot upon his forearm, which he marked with a pencil, and that this letter would bleed. The phenomenon promptly appeared at the time and in the place suggested. Patches of dermatitis resembling burns and other skin-lesions have also been induced by Edwards and others through suggestion.

As a result of such experiments and of more careful observations the conviction has grown that feigning in the ordinary sense of the word has no place in the production of the hysterical dermatoneuroses, and that the term "hysterical feigned diseases" of the skin is a misnomer.

Barthelemy, in his exhaustive treatise on *Dermographism*, shows that in numerous instances the appearances presented by dermatographism are produced by autointoxication of some sort. The close analogy between this condition and that of ordinary *erythema ab ingestis*, or of common urticaria, as regards their pathological anatomy and mode of production, seems to indicate that intoxication or autointoxication of some sort is the cause of their production in each case. Barthelemy proposes to employ the term "dermatoneurose toxivasonotrice" as a secondary appellation of dermatographism.

Whether autointoxication or intoxication, as by lead-poisoning, etc., may or may not account for the production of hysterical symptoms of other kinds, I am not prepared to express an opinion. I am inclined to

believe, however, that such causes may have influence in the production of some of the skin-manifestations of hysteria. To go further into this subject would, however, lead me too far from the original object of this paper, which has been to group together and display the hysterical neuroses of the skin so far as our present knowledge of these affections will permit, and to claim for them a place in our nosology.¹

A CLINICAL STUDY OF THE OPHTHALMIC SYMPTOMS SEEN IN A CASE OF FRACTURE OF THE ANTERIOR BASE OF THE SKULL.²

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ON February 6, 1894, W. H. G., a thirty-eight years old brakeman, came to my ophthalmic clinic at the Presbyterian Hospital in Philadelphia. He stated that on December 15, 1893, while attempting to place a coupling-pin in position between a lumber and a large freight car he involuntarily raised his head, when instantly it was caught and squeezed between the high, projecting platform of the large

¹ The forms of disease referred to in the following notes have not been described at length in the present paper. I hope to have an opportunity to refer to them in a future communication.

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Levy. *Maladie de Raynaud et érythromélgie d'origine hystérique.* Soc. de Biol., October 20, 1874.

Lannois. *Paralysie vaso motrice des extrémités ou érythromélgie.* Thèse de Paris, 1880, p. 11.

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² Patient exhibited before the Section on Ophthalmology of the College of Physicians of Philadelphia, and paper read before the Medical Association of the Baltimore and Ohio Railway Surgeons.

car and a pile of lumber that had been improperly laden beyond the "dead-line" of the smaller car. He immediately became unconscious, fell free of the tracks, and was carried to the Hospital of the Protestant Episcopal Church by some fellow-workmen.

Bringing a certificate from Dr. Walter R. Lincoln, who was one of the resident surgeons, that he was admitted to the institution on December 15, 1893, and that his injuries consisted in "contused wounds of the scalp, concussion of the brain, and fracture at the base of the skull," induced me to address a letter to Dr. Lincoln, asking him, if agreeable and convenient, to obtain, if possible, a brief history of the condition of the case when it was first seen. In response, the accompanying very interesting and excellent account was received:

"I received your letter of inquiry, and I am very sorry that I have no notes except name, etc., at hand concerning the case, and hence will have to call upon my memory. You can secure a copy of the notes of the case by writing to Dr. Henry Doan, at the Episcopal Hospital.

"I was resident in charge of the case, and, of course, remember it well. W. H. G., aged thirty-eight years, married, was admitted to the Protestant Episcopal Hospital, December 15, 1893. The case was admitted during my absence. His head was caught between a heavy timber and a freight car, the force producing the injury being applied, as nearly as I could make out, about one-half inch above the tip of both the auricles, and acting in directly opposite directions. He had at these places on the head two scalp-wounds, which were examined closely at the time by my substitute, Dr. Samuel C. Falls. Dr. Falls could not find any evidence of fracture at these points. When I returned late at night I found the patient's wounds dressed and the patient, as I remember, in the second stage of cerebral concussion; somnolent, but easily aroused, and very irritable when disturbed in any way. He was placed at once on restricted milk-diet and on a course of calomel, his bowels being first freely purged by Epsom salt. The calomel was continued, I think, about two weeks, possibly longer, but not to the point of salivation, although the bowels were kept freely moving, possibly about two or three times in twenty-four hours.

"The morning after admission the patient called my attention to his seeing 'everything double'; I then examined him more carefully and found his right external rectus muscle paralyzed and that he had a convergent squint. He was unable to close the eyelids of the right eye. The right pupil was, I think, contracted. At any rate, the pupils were markedly unequal. There was paralysis of the right facial nerve and there was no sensory paralysis.

"The temperature, while it was persistently fluctuating, was never, as I remember it, over 101° , and for the first two weeks I do not think that it was lower than normal. From the right ear small quantities of bloody fluid (not tested) kept discharging for possibly a week after admission. The patient said that when the injury was received he bled from the eyes(?), ears, and nose. His eyes and eyegrounds were examined by Dr. Albert C. Heyl, who, if I remember rightly, found a distinct, abnormal tortuosity of the vessels and an engorgement of the veins of the eyegrounds. The patient was rendered quite deaf in both ears; in one more than the other. There was a slight amount of subconjunctival hemorrhage in the right eye.

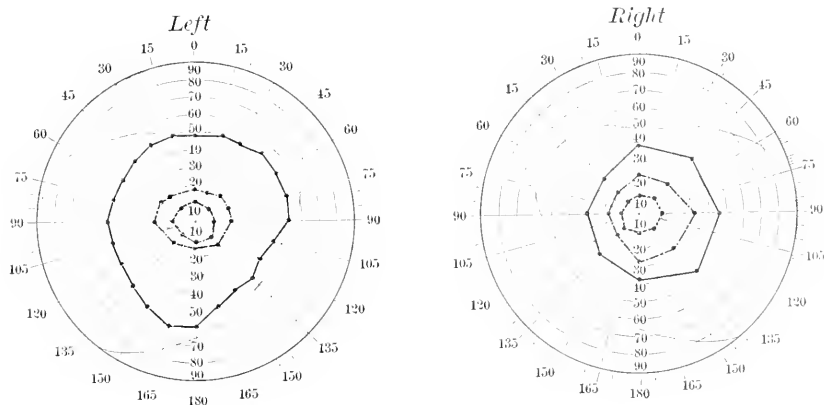
"After the calomel was stopped the patient was placed upon iodide

of potassium, I think fifteen grains daily, and kept upon this until he was discharged from the hospital on January 17, 1894."

A letter from Dr. Doan a few days later confirmed the statements of Dr. Lincoln and brought the following additional notes: that on the fourteenth day after the accident "deafness was disappearing, but the paralysis of the right facial and external rectus still remained."

At the time of my first examination two irregular, linear scars could be seen on the forehead, running parallel to one another diagonally from the left upper temporal region to the right eyebrow. There were also some superficial cicatrices in the scalp immediately over and back of both ears. The right pupil, which was one millimetre smaller in size than its fellow, equalled two millimetres in its horizontal meridian. Both irides were equally, though feebly, responsive to light-stimulus, and still less so to accommodative efforts. Direct vision for form in each eye seemed unimpaired. Accommodative power was rather weak for age and refractive condition. The fields of vision for form, as shown

FIG. 1.



in the accompanying diagrams, were somewhat concentrically contracted, this being the more noticeable in the right eye. The color-fields for red and green, as can also be seen in the same diagrams, were very much diminished, especially in the left eye.

There was a paresis of the right levator palpebrae, producing a very slight ptosis, every effort of the muscle to raise the lid being associated with a pronounced compensatory movement upward of the eyeball, so that at the moment of extreme action the lower corneal border was two millimetres higher than that of the opposite eye. The lower fibres of the right orbicularis palpebrarum were paralytic, producing a pronounced lagophthalmus and stillicidium. The upper fibres of the same muscle were sufficiently paretic to fail to permit any more than two millimetres of downward movement of the lower border of the upper lid, thus preventing closure of the eye. On the left side there was an extremely slight lagophthalmus. The fibres of the corresponding orbicularis palpebrarum were manifestly though very slightly paretic, each attempt at closure of the lids, although resulting in an apparently good response,

being accompanied by a spasmodic twitching of the muscle, especially in its upper fibres. At the moment that the muscle was exerted to its utmost action the right eye turned up and out and the lower face was dragged to the left. The patient voluntarily stated that it was much easier to close his right eyelid when his mouth was open.

There were an absolute palsy of the right externus and a slight paresis of the left externus, the eyes deviating markedly inward, particularly the right one, when alternately covered from fixation upon some distant and near object situated on the median line. The patient constantly complained of a disturbing and distressing double vision for both far and near, this being made worse when he attempted to look at near objects. Prismatic tests showed that there was a pronounced homonymous diplopia, the false image at times being situated upon a higher level than the true one. In attempts at lateral deviation to the right the right eye gave a short twist up and out at the same time that the left eye turned markedly inward. In similar attempts to the left side the outward movement of the left globe was somewhat impeded and the eyeball rotated slightly upward.

The right superciliary border was drooped, there being almost total paralysis of the frontal fibres of the right occipitofrontalis. Both the horizontal and the vertical fissures of the brow and forehead were almost completely gone. The fibres of the right side of the corrugator supercilli were markedly parietic. The right face was almost mask-like. Not only were the muscles of the right epicranial and palpebral regions involved, but the muscles elevating the right side of the bridge of the nose, the elevator of the right angle of the nose, the dilators, compressors, and depressors of the right nostril were all affected, showing that the entire muscular grouping of the nasal region was included.

He could not whistle, smile upon the right side, depress the right corner of his mouth, or elevate or puff the right cheek, plainly evidencing that the nerve of impulse for movement in the three maxillary regions was gone.

A careful ophthalmoscopic examination showed upon both sides a typical venous stasis in the retinal circulation without any other evidence of intraocular disturbance. Both nerve-heads were plainly visible, and were devoid of any coarse pathological change.

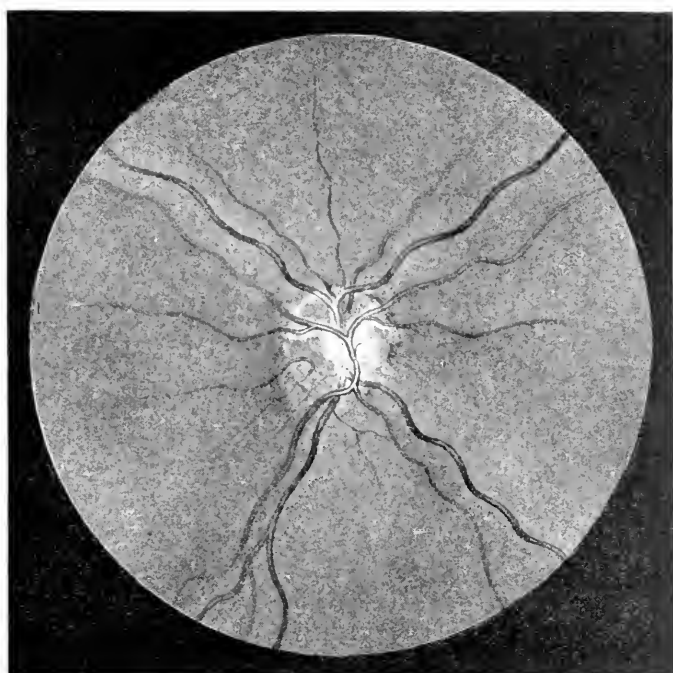
In order to make further study of the case I sent him to my friend and colleague, Dr. Arthur H. Cleveland, Surgeon-in-charge of the Ear, Nose, and Throat Dispensary at the hospital, with the request that he make an examination of the aural conditions. His report, received a few days later, read: "Watch not heard on contact on injured side. Large fork heard at four inches. Bone-conduction not good; Rinne's test. Both meatuses contain flaky collections of epithelium and blood. No pain. Right membrana tympani normal; the left membrana tympani very much congested over its entire upper area, and has a very small perforation in the upper posterior segment."

Some pain could be provoked by decided and repeated pressures over the lachrymal bones and in the regions of the antrum. There were no signs of caried teeth or bone-disease about either the right or the left face. He added that for some time after the accident he had had a peculiarity and hesitancy in speech and difficulty in deglutition, the right half of the tongue feeling rough and dry. Although no history of any form of relevant dyscrasia could be elicited from the patient,

or any recognizable signs found, yet he was placed under ascending doses of iodide of potassium, commencing with forty grains, well diluted, three times daily. He returned in about two weeks' time, at which visit (the second) I found that his ocular conditions were improved.

On March 2, 1894, through the courtesy and kindness of Dr. S. Weir Mitchell, he was carefully examined at Dr. Mitchell's clinical service at the Infirmary for Nervous Diseases. In addition to the above findings it was noted that he had *nigritia lingue* and that the teeth were stained black. The tongue was protruded in the median line. The right side of the face felt a little firmer and denser than the left side, this perhaps being the result of traction of the muscles of the left side. The pupils

FIG. 2.



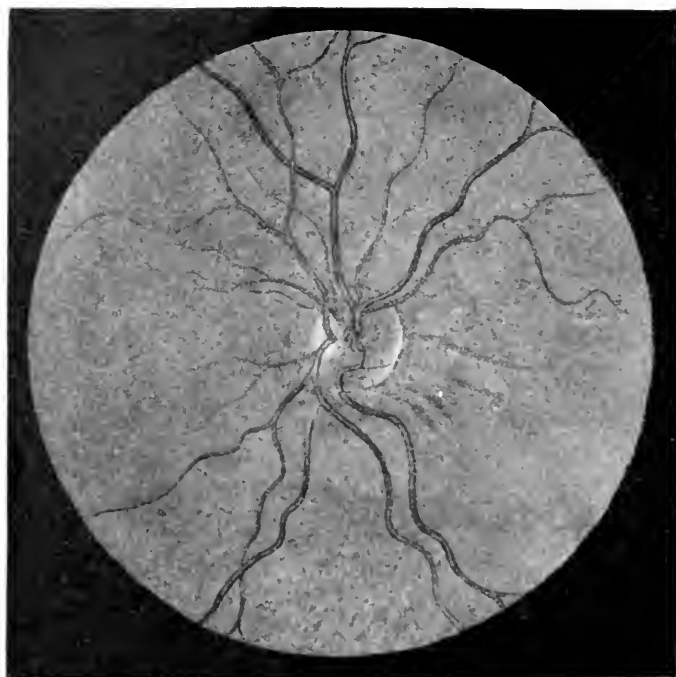
Ophthalmoscopic appearance in right eyeground.

were equal and regular and the irides were freely reactive to light, but doubtfully appreciable to accommodative efforts. Vision was markedly lessened in each eye, that of the right one being reduced to the ability to see to count fingers at one-third of a metre's distance. Tactile sensibility was impaired upon the right side of the face, and not lost. Faradic contractility was wanting and galvanic contractility was diminished. The patient stated that everything tasted "salty." He was unable to recognize the taste of sugar upon any part of the tongue. He asserted that he could taste salt when it was placed upon the anterior portion of the left side of the tongue. He was not able to recognize acetic acid. He said that tincture of *nux vomica* tasted sour when

a drop was placed upon the left side of the tongue. There was no palsy in the upper or lower extremities. Dynamometer: R., 115; L., 115. Station was a little unsteady. Knee-jerks were feeble, though reinforceable. The heart was rhythmic and the sounds were clear. At this examination it was noticed that the right upper lid could be closed with the finger, and that for a time it remained partially closed.¹

I lost sight of the patient for four months, when, through the kindness of Dr. Conrad Berens, one of my colleagues at the Wills Eye Hospital, I was privileged to make my third examination.

FIG. 3.



Ophthalmoscopic appearance in left eyeground.

At this time there was a marked and radical change for the better. Uncorrected vision and accommodative power in each eye were normal for age and refractive condition. Ocular movements were good in all directions, there actually being the faintest indication of an exophoria for distance. The pupils were almost the same size, that of the left eye being still a trifle larger. The irides responded equally and freely to light-stimulus, accommodative impulses, and efforts for convergence.

The eyegrounds, which presented the same appearance as when I first saw them in the preceding February, were, as can be seen in the accom-

¹ I am under obligations to Dr. Frank Savary Pearce, one of the clinical assistants at Dr. Mitchell's clinic, for kindly transcribing these notes of the case from the records at the Infirmary.

panying reproductions, carefully and correctly sketched by Miss Margaretta Washington, of this city.

The patient stated that he had faithfully persisted in the tri-daily dose of iodide of potassium constantly since I had first ordered it. At this juncture the case was lost for clinical study.

The extended and detailed study of this case in the single examination of Drs. Mitchell and Cleveland, and the three examinations that I was enabled to obtain, is here given in full, as it offers much that is interesting and instructive.

As seen by the actual conditions during the examinations, there was an involvement of the right facial (the seventh) nerve as far back as internal to the chorda tympani and tympanic branch within the descending portion of the aqueductus Fallopii, the dryness and the impaired taste of the right side of the tongue distinctly supporting this belief.

The early history of not only hesitancy in speech, but peculiarity in character of speech-tone, associated with pronounced difficulty in deglutition, is expressive of temporary paresis of the palatal, glossal, and pharyngeal muscles. These symptoms must necessarily carry a portion of the lesion still further back along the seventh nerve; that is, to the origin of the greater, lesser, and external petrosal nerves near the hiatus Fallopii.

This argument of involvement of all of the branches of the right facial nerve is still further strengthened by the significance of the auditory symptoms. An analysis of these symptoms shows that the *portio mollis* of the seventh nerve must have been disturbed in a position that is internal to its vestibular and cochlear branches.

The slight disturbance to the corresponding nerve upon the opposite side must have been peripheral, as none of its branches of distribution that were above the temporo-facial nerve were involved, and it must have been isolated in the temporo-facial branch (especially in the malar twig), as the more peripherally placed cervico-facial branches escaped.

From the very beginning both of the second nerves showed symptoms of unequal and temporary pressure upon their tracts, this being the more pronounced with the right one. Gradually increasing until vision in each eye became greatly lowered, it decreased sufficiently to allow the recovery of normal acuity of vision in each organ.

The involvement of both third nerves, with the greater disturbance upon the right side, may, if the symptoms be carefully analyzed, be presumed to have been dependent upon intracranial lesion exerting its influence at or near the clinoid processes where the nerves pass along the outer wall of the cavernous sinus; this assumption being further borne out by the fact that the levator palpebrae is supplied by the superior division of the corresponding main nerve-trunk.

The fact that both sixth nerves were affected, producing right abducens palsy and left abducens paresis, is very important. As each basilar trunk passes forward and pierces the dura mater just beneath the posterior clinoid processes, it proceeds anteriorly through the cavernous sinus. In these positions the nerve-trunks approach the nearest to one another, so that any single disturbance in this vicinity would give identical lesions in the widely separated peripheral muscles which they supply.

The flow of blood from the right ear for a week, the want of symptomatic evidence of meningitis or cerebritis, and the persistent though eminently characteristic venous congestion of the retinal vessels, all in association with the other symptoms, clearly indicate fracture of the right temporal bone, with probable rupture of a neighboring sinus in the dura mater.

To emphasize the value of the ocular symptoms seen in this case, when studied in conjunction with one another and when examined in relation with the other symptomatic groupings, has been my excuse for offering this case for publication.

REVIEWS.

CLINICAL LESSONS ON NERVOUS DISEASES. By S. WEIR MITCHELL, M.D., LL.D. Philadelphia and New York: Lea Brothers & Co., 1897.

ANY book from the pen of S. Weir Mitchell is certain to attract attention. The little volume before us is an interesting account of "odds and ends" of neurological practice, related in Dr. Mitchell's happy style—a style that is marked by just enough eccentricities of expression to make it original and forceful. Even the gods are caught napping at times, and so we read on page 46: "Miss C., of Maine, aged forty years, *single*;" and on page 243, the expression "I am not at all secure that these inferences are safe," must be a slip, and so evidently is "lips" for "lids," on page 77. The subject-matter of the book is, however, of such great worth that if there were tenfold as many errors as there actually are they could not detract from the pleasure the reading of these pages affords. The greater the reader's neurological experience the more he will appreciate Mitchell's selection of subjects and the very unusual character of some of his observations. The book is full of such details as are not apt to be included in any of the ordinary text-books. We can refer only to a few of them:

In Chapter II. the author treats of recurrent melancholia and of some equally queer forms of periodical melancholia. The interest of these cases lies not in their great rarity, but rather in the comments which Mitchell sees fit to make. They are frequent enough to come under the observation of every neurologist. The reviewer has seen several that recurred regularly every autumn, while in Mitchell's cases the spring-time has been the favored period. The seasonal relation is, therefore, a little doubtful.

Disorders of sleep are discussed very thoroughly in Chapter IV. The cases of sleep-ptosis and of nocturnal paralysis are of especial interest. The patient with "unreasonable fears," mentioned on page 67, is a type of a large number of persons with imperative conceptions which are apt to be most annoying in the *predormitium*, as Mitchell would say. Those of us who struggle almost continually with sleepless patients would have been glad to hear a word or two regarding the man "who does not sleep at all," and the entire absence of therapeutic suggestions is very noticeable in this chapter, as in a few others. "Respiratory failure in sleep" calls attention to a remarkable and alarming condition which occurs in spinal sclerosis and other chronic disorders.

We must pass over a number of interesting chapters until we reach the tenth, in which erythromelalgia is fully described. This chapter alone makes the book worth having and reading. It will help to set aside doubts that have arisen in the minds of many regarding the differential diagnosis between this condition and Raynaud's disease; and

Dr. Taylor's beautiful plates are a great aid in attempting to distinguish between the two diseases. Mitchell can "hardly imagine anything clinically more strange than to consider the cases [of erythromelalgia and of Raynaud's disease] as one." Nowhere have we seen the differential diagnosis between the two diseases given as clearly as on page 179. We are willing to adopt the author's decision as to the vast difference between the two diseases, but confess that even after reading this chapter we had opportunity to see a case in which it was difficult to decide whether the patient was suffering from the one disease or the other. That both these conditions are often secondary to some constitutional malady we firmly believe. In the treatment of erythromelalgia the author favors stretching of the nerves in the first instance, and later on resection of their trunks.

Remarkable spinal anterior curvature with mental aberration we know from previous publications, but it seems that no one else has, up to the present time, observed any similar cases. That they constitute a special type of disease is hardly to be doubted.

Chapter XIII. has afforded us an immense deal of personal gratification, for it proves that recent authors who have had so much to say about reflex ocular neuroses do not deserve the credit of having originated the conception that headaches and other neuroses were in any way related to abnormalities of the ocular muscles. The idea was entertained by Dyer, Derby, and Mitchell as long ago as 1862; but Dr. Mitchell has not been able to see any positive results in the treatment of epileptics. We are entirely in sympathy with him when he says, on page 228, that he wishes he "could have seen some of the epileptic persons whom they [Stevens and Ranney] so successfully treated." Dr. Mitchell does not appear to know that nowadays "muscles are cut" for the relief, or cure, of spinal syphilis, and what not.

The chapters on Hysterical Contractures and on Certain Rotatory Movements in the Feeble-minded contain much that is of interest to every medical man, and well deserve a careful reading.

We would not end this review with the ordinary faint praise, but wish distinctly to say that we have found so much profit in studying this book that we hope Dr. Mitchell will continue his clinical lectures, and will publish a similar volume from year to year. With the exception of the few errors noted above, the typographical work is excellent, and the publishers are to be congratulated upon the general appearance of the volume.

B. S.

THE DISEASES OF THE STOMACH. By DR. C. A. EWALD. Translated and edited by MORRIS MANGES, M.D. Second revised edition. New York: D. Appleton & Co., 1897.

SINCE the original work appeared in German, more than half a dozen years ago, it has passed through three German editions and has been translated into five foreign languages. The value of the work was at once recognized, and has increased with each edition. The last German edition of this work may be said to be the best text-book on these diseases in any language, and its value is enhanced by the careful and skilful editing of Dr. Manges. Although the German work may lose

some of its individuality by being added to by the translator, yet the latter has really increased its value by furnishing new material which has appeared since the last German edition, and has brought the work as nearly "up to date" as any book can be in these days, when publications are so numerous and so many experimenters are at work adding to our knowledge in all branches of medicine. For the general practitioner as well as for those who are specially interested in these diseases—we will not say "specialist," for we trust there are none such for this organ of the body—we can recommend no other work dealing with these maladies as of equal importance.

The views of Dr. Ewald are conservative, but he does not hesitate to express his own beliefs firmly on the many points which are still unsettled in reference to these affections. He does not hold some of the most advanced views of other workers in this branch, but his opinions will stand much careful investigation before being overthrown.

There are many points which we should like to discuss here at length, but as they are still undetermined we will only call brief attention to them to show what the latest ideas on the subject are. In discussing the proper method of washing out the stomach, p. 99, the author states that a large glass funnel should be used, for with this it is much easier to discover any foreign substances which may be drawn out from the stomach, and which are apt to be lost when a small funnel is used and the siphoned water is at once thrown away into a pail or jar. This is a small point, perhaps, but we know from personal observation that it is one to which ordinarily not sufficient attention is given.

Ewald points out that in palpating the stomach there are two structures in its neighborhood which may lead to confusion in some cases—one of these is the pancreas; it may be possible to palpate this organ where the abdominal walls are very thin and relaxed and where the stomach is depressed, but we cannot feel that mistakes would often occur by mistaking the pancreas for a tumor of the stomach. The other structure is a small lymphatic gland at about the middle of the greater curvature, in the gastro-colic ligament. He thinks that this may lead to even more confusion than the pancreas. We think that it is usually overlooked, and if discovered by a skilful diagnostician would not be apt to lead into error. We are surprised to note that almost nothing is said throughout the work of the great motility of the pylorus in certain cases where the stomach is much enlarged and depressed. In some of these cases the pylorus may be pulled far out from its normal position, and may be so mobile as to be pushed up or down, to the right or left, for several inches. In fact, we believe there is no other organ in the abdomen which, under given conditions, is so mobile; and it is a point of great importance in the diagnosis of a doubtful abdominal tumor.

On the question of faradization of the stomach we agree entirely with the stand taken by the author. Experimenters disagree materially on the value and results of electricity as applied to the stomach, and, in spite of a valuable contribution which lately appeared on this question in the *New York Medical Journal*, we cannot consider the points at issue settled. The editor has added several important paragraphs to this subject which admirably supplement the remarks of the author. In reference to the "deglutible stomach electrode," we might say from personal experience that it is a most unpleasant body to swallow, and

one we should hesitate to use or recommend frequently, notwithstanding the undoubted benefit which follows its use in some cases.

Of value both to the surgeon and physician in the operation of gastrostomy is Ewald's suggestion, p. 148, that the opening of the fistula in the stomach should be as close to the pylorus as possible, "so that with a soft rubber tube the food may be introduced directly into the duodenum, the pylorus serving, if possible, as a valve." This may be impossible where the pylorus itself is involved by a carcinomatous growth, but in other cases is undoubtedly the correct procedure.

In the diagnosis of carcinoma of the stomach we do not agree with Ewald's implication that it is easy to differentiate between this disease and essential anaemia. He says that the mistake of confounding the two affections occurs less often in Germany than elsewhere; "at least in English literature I have found the reports of quite a number of such cases in which a careful examination of the blood and of the stomach-contents ought to have prevented such errors." The differential diagnosis is, in a certain number of cases, of extreme difficulty, and we have seen one case in which no diagnosis was made, though studied with great care for several weeks, and up to the time of death; unfortunately, no autopsy was obtained. We feel also that more help can be derived from systematic examinations of the blood in doubtful cases of carcinoma of the stomach than Ewald appears ready to admit; and his paragraph on conditions of the blood in this disease seems to us insufficient.

The question of the cause of gastric ulcer still remains in doubt, and Ewald in a measure begs the question, in our opinion. He says that the alkalinity of the blood does not prevent the autodigestion of the gastric mucous membrane, but that gastric ulcer is due to "the disproportion between the acidity of the gastric juice and the composition of the blood;" and "as predisposing factors, however, we must recognize hyperacidity of the gastric juice, produced by hyperchlorhydria, as well as a change in the composition of the blood in the presence of the normal acidity." That autodigestion does not depend only on the alkalinity of the blood is undoubtedly true; but what the necessary composition of the blood must be to bring about in part the production of an ulcer we do not know, and the old theory of Pavy, that the blood kept the lower layers of the mucous membrane alkaline, and so prevented autodigestion of them, must, we think, still have some truth in it. And these relative relations of the gastric juice and the blood, on which Ewald based his theory, are almost as vague as Pavy's idea.

The site of gastric ulcer is, according to Ewald, "preferably at the pylorus and greater curvature." This conclusion he draws from his own experience and Nolte's statistics, drawn from a very small number of cases. But Welch's statistics, made up from nearly 800 cases, give 65 per cent. of the cases as occurring on the lesser curvature and posterior wall. These latter figures are given in a footnote by the editor, and we do not understand on what fair ground Ewald takes objection to these and those of Langenhans, which agree with them; he simply states that they are opposed to his own experience, which is not proof that they are not correct; and we believe they should take precedence over Ewald's figures.

We have not made these criticisms from any wish to disparage the work, but simply with a desire to show some points on which all students will not agree. We would like to prolong this review in order to bring

out many more points of interest and to show in what a masterly way they are dealt with. There is no other book which can take its place, and we feel confident that it will hold its own for many years to come.

The book as it comes from the press is well gotten up, though, like almost all our American text-books, too heavy to be easily handled. The German edition, which contains nearly as many pages, is much lighter, and though the paper is thin, not too thin to be agreeable. Misprints are not numerous, but we have noted a few. The editor has translated the book with success, and it is for this reason that we regret to see such an awkward sentence as occurs on p. 417, as follows: "If the cicatrix is circular and at about the middle of the stomach, forming the hour-glass stomach, or large, saccular dilatations may be formed, then it may happen that if for some reason lavage is performed later on, the remarkable phenomena may appear that the stomach apparently cannot be emptied."

The following quotation, with which it pleases us to close, might well have been adopted by Ewald as the motto for his own work. It cannot too often be impressed on the minds of students of this branch of medicine: "in fact, such terms as dyspepsia, indigestion, etc., are merely descriptive of a functional disturbance, but not of a distinct disease; and hence to-day we ought not to find a physician who considers a disturbance of digestion as a separate disease," p. 193. R. N.

PRACTICAL MANUAL OF DISEASES OF WOMEN, AND UTERINE THERAPEUTICS FOR STUDENTS AND PRACTITIONERS. By H. MACNAUGHTON JONES, M.D., M.Ch., Master of Obstetrics (Honoris Causa), Royal University of Ireland; Fellow of Royal Colleges of Surgery of Ireland and Edinburgh; formerly University Professor of Midwifery and Diseases of Women and Children, and Examiner in Midwifery and Diseases of Women and Children in the Royal University of Ireland. Seventh edition, revised and enlarged, with 565 illustrations. Pp. xxiv., 909. London: Ballière, Tindal & Cox, 1897.

THE reader who is familiar with the earlier editions of this work will not need the assurance in the preface that the present one shows evidence of most careful revision. Not only has the author recognized and corrected many of the faults which called forth some sharp criticism in the past, but his *Manual* has lost much of the local coloring which made it objectionable to American readers, and has become what he says he has tried to make it, "thoroughly cosmopolitan in character." Indeed, his brethren on this side of the water may well be gratified at the handsome recognition which he gives to their work—another proof of the power of science, and especially medical science, to overcome insular prejudice.

This is such a compact work that we find it difficult to choose separate sections deserving of especial approbation. The forty-nine chapters form a natural sequence, though the arrangement of subject-matter is different from that with which we are familiar. The introductory chapters on Anatomy and Examination are followed by two on Minor Gyneco-

logical Operations. Some of the statements in the section on Intra-uterine Medication will hardly meet with general approval.

The Disorders of Menstruation are exhaustively treated in Chapters VI. to VIII., inclusive, an excellent feature being the thorough consideration of the use of drugs.

The chapters on Displacements (IX. to XIII.), including one hundred pages, show internal evidence of the author's familiarity with the work of foreign surgeons. We are sorry to see that he retains a number of antique pessaries (especially those for the supposed relief of anterior displacement) which we hoped had long been banished from text-books. Zwanck's abomination still appears, as well as a terrible instrument devised by Routh. Neither do we regard with approval the commendation of the old bloody operation for the relief of antelexion. The description of the various operations for the repair of lacerated perineum appears under the head of "Prolapsus," a unique and by no means pleasing arrangement.

The chapter on Laceration of the Cervix is brief, and the description of the operation not any too clear, but on the whole the author's judgment of its value is quite fair.

Chapter XVII., on Peri- and Parametritis, is a little old-fashioned, especially the attempt to establish a sharp line of difference between the two affections. We are sorry to see a separate chapter on Pelvic Hemorrhage, which might lead the inexperienced to infer that it was a condition rather than a symptom. Uterine Fibroids are thoroughly discussed (pages 381-499), the various radical operations being well described and illustrated.

Separate chapters are devoted to Tuberculosis of the Uterus and to Deciduoma Malignum. Cancer of the uterus receives due attention, and the most recent operative technique is described.

Diseases of the Ovaries and Tubes are well handled in Chapters XXX. to XXXVII., inclusive, though the illustrations are timeworn. Due attention is paid to conservative operations on the adnexa, but we note with surprise the absence of any reference to the vaginal section for the removal of diseased ovaries and tubes. We would hardly regard the views of the American surgeon, quoted so largely on pages 615 to 617, as representing the present state of opinion of salpingo-oophorectomy in this country.

Affections of the Bladder and Ureter are brought up to date, and there is also a chapter (XLIV.) on the Kidney, an innovation which we can hardly commend in view of the severe criticisms which have been heaped upon gynecologists for invading the territory of the general surgeon. The section of Diseases of the Rectum is more in place, and contains some useful hints on treatment.

Chapters on Sterility, Gynecological Electrotherapeutics, and Massage complete this excellent working-manual. We have endeavored to point out a few of its faults. Its virtues are not a few, chief among which are the condensation of a large amount of practical information in a short space without sacrifice of clearness, and the evident purpose of the author not to allow himself to be biased by local methods or opinions. More attention is paid to general and local medicinal treatment than is usual in modern text-books, with their strong surgical trend, and throughout the author writes from the standpoint of the general practitioner as well as from that of the specialist. H. C. C.

THE CELL IN DEVELOPMENT AND INHERITANCE. By EDMUND B. WILSON, Ph.D., Professor of Invertebrate Zoölogy, Columbia University. (Columbia University Biological Series, IV.) 8vo., pp. xvi., 371. New York: The Macmillan Company, 1896.

IN this day of rapid development of medicine along broad lines of scientific achievement it is particularly desirable that the physician should be in touch with the progress in all those cognate sciences which can in any way contribute to that development. As a student of disease he should be well grounded in all the essential facts of the phenomena of life, and should be in a measure their exponent in his community. For this reason it is a very agreeable duty to call the attention of our readers to the *Columbia University Biological Series*, edited by Professor Henry F. Osborn, the fourth volume of which has recently appeared and is the special subject of this review. An account of the progress of the idea of evolution "From the Greeks to Darwin," "Amphioxus and the Ancestry of the Vertebrates," "Fishes, Living and Fossil," are subjects which may well occupy the attention of the physician of an evening, and are sure to afford suggestions of biological relations which must prove of service in broadening his conception of disease. And while these works are scientific to the core, their contents are so presented as to make the hours spent in their perusal most enjoyable.

The Cell in Development and Inheritance is a most delightful book in every particular. It is only necessary to turn hastily the pages to become aware of the clear, sharply cut typography and of the wealth and beauty of the illustrations. No such collection of pictures representing the minuter structure of the cell in the various phases of its life-history has ever before been brought together. The bibliography is abundant, and is conveniently arranged for reference, a list of the more important works upon each topic being appended to each chapter, while a fuller bibliography is added at the end of the volume. A glossary, too, is found here of the many terms which have sprung into existence to meet the requirements of modern cytological research, and carefully prepared indices, both of authors and subjects, add greatly to the usefulness of the book as a work of reference. In every sense it is a model of good book-making, which might with profit be copied by many an author and publisher.

But while we cannot repress the desire to speak thus of the physical attractiveness of the book, it is more particularly its clear and elegant statement of our knowledge of the cell, of its structure and of its functions, in so far as they bear upon the processes of reproduction and heredity, which we would bring to the notice of our readers.

The half century which has elapsed since the enunciation of the cell-theory by Schleiden and Schwann has added ever-increasing evidence of the correctness of that theory, until now the anatomist, the physiologist, and the pathologist, whether of plant or animal life, seeks in the cell the ultimate explanation of all the phenomena which he would interpret. It is but natural, then, that we should look to the cell for light upon the various problems of heredity, and in Prof. Wilson's book we find an able and entertaining exposition of all those structural and physiological properties of the cell which have bearing upon these problems.

The subject is very properly introduced by a historical sketch of the development of our ideas of cell structure and function and of the various theories of inheritance. This is followed in successive chapters by statements of the general morphology of the cell, of the process of cell-division, of the peculiarities and mode of origin of the germ-cells, of fertilization of the ovum, of the preparation of the germ-cells to participate in the conjugation incident to fertilization, of those aspects of cell-chemistry and physiology which furnish suggestions as to heredity, of segmentation or cleavage of the fertilized ovum; and, finally, the various theories of inheritance and development are discussed in the light of our present knowledge of all these phenomena.

It is impossible within the narrow limits of a review to give any adequate statement of the conclusions arrived at. In general it may be said that Prof. Wilson agrees with Hertwig, Strassburger, Kölliker, and Weismann in attributing the predominant influence in heredity transmission to the chromatin of the nucleus. While realizing the significance of this fact, it is, nevertheless, admitted that "the explanation of development is at present beyond our reach." "Despite all our theories we no more know how the properties of the idioplasm involve the properties of the adult body than we know how the properties of hydrogen and oxygen involve those of water. So long as the chemist and physicist are unable to solve so simple a problem of physical causality as this, the embryologist may well be content to reserve his judgment on a problem a hundredfold more complex." Regarding the historical origin of the idioplasm it is stated that "the idioplasm of every species has been derived by the modification of a pre-existing idioplasm through variation, and the survival of the fittest. Whether these variations first arise in the idioplasm of the germ-cells, as Weismann maintains, or whether they may arise in the body-cells, and then be reflected back upon the idioplasm, is a question on which, as far as I can see, the study of the cell has not thus far thrown a ray of light." "We are utterly ignorant of the manner in which the idioplasm of the germ-cell can so respond to the play of physical forces upon it as to call forth an adaptive variation."

Incomplete and unsatisfactory as these conclusions may appear, they nevertheless represent a distinct advance toward the solution of the profoundest problem of biology. "The splendid achievements of cell-research in the past twenty years stand as the promise of its possibilities for the future, and we need set no limit to its advance. To Schleiden and Schwann the present standpoint of the cell-theory might well have seemed unattainable. We cannot foretell its future triumphs, nor can we repress the hope that step by step the way may yet be opened to an understanding of inheritance and development." J. S. E.

The substance now generally identified with chromatin, which by its inherent organization involves the characteristics of the species. "The physical basis of inheritance."

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

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Treatment of Opium-poisoning by Potassium Permanganate.—DR. WILLIAM OVID MOOR points out that atropine, cocaine, veratrine, pilocarpine, aconitine, caffeine, hyoscyamine, hyoscyne, and phosphorus treated by the permanganate solution give rise to no reaction. Entirely otherwise is it with opium and its alkaloid morphine. After reporting his personal experience of antagonizing one-half grain of morphine by seven grains of the permanganate in eight ounces of water taken immediately after, he advises the use of this antidote, subcutaneously in from $\frac{1}{3}$ to 1 per cent. solution, in severe cases of ether- and chloroform-poisoning; asphyxia from illuminating-gas, drunkenness, laryngeal obstruction; and in uræmia, eclampsia, and similar cases, in addition to the ordinary methods. More than ninety instances of its successful use in opium-poisoning have been reported. These indications are offered: (1) Internally, seven or eight grains in diluted solution, to antidote the opium or morphine in the stomach. (2) To neutralize morphine which is returned to the stomach from the circulation, one grain in solution, frequently repeated. (3) As a physiological antidote, subcutaneous injection of 1 per cent. solutions.—*Therapeutische Wochenschrift*, 1897, No. 7, S. 147.

[The reports of its successful use, already of considerable number, lead to the conclusion that this should be considered as the antidote of choice.—R. W. W.]

Acetic Acid as a Menstruum and Solvent.—PROF. JOSEPH P. REMINGTON has undertaken a series of experiments to ascertain whether this drug cannot be made to replace alcohol in at least some of the preparations now in common use.* The antiseptic power is frequently overlooked. Slightly acidulated liquids are palatable to most patients, and these, when combined in prescriptions with syrups, are particularly acceptable, inasmuch as the

acid counteracts the cloying sweetness of the syrups. Further, it is desirable to have alternative preparations of the same drug to give to patients who are liable to become victims to the alcohol-habit. In an elaborate study it was found that acetic acid could advantageously replace alcohol in the extraction of a drug like nux vomica. A number of other drugs have been exhausted with varying strengths of acetic acid, such as sanguinaria, kola, ipecacuanha, squill, cinchona, and colchicum seed.—*American Journal of Pharmacy*, 1897, No. 3, p. 121.

Digitalis and Digitaline.—DR. HENRI HUCHARD states that the generally received opinion is that of all the preparations of digitalis that obtained by maceration possesses the most marked diuretic properties, while digitaline shows the least. This, however, is an error, and in every case the plant possesses properties very variable, according to the country in which it grows; this is shown by the great variations in dosage, and in this way may be explained the harmlessness of the very large doses used in Roumania in the treatment of pneumonia. Further than this, faulty methods of preservation and the substitution, in part, of leaves similar in appearance (*Coniza squamosa*) give rise to variations in strength. Thus some failures which have been attributed to too great degeneration of the myocardium should rather have been laid to faulty methods of collection and preservation. For these reasons the infusion, from a pharmaceutical standpoint, should be considered as an inferior preparation to crystallized digitaline, which is always the same. Further, it is denied that this glucoside is inferior in diuretic power to the infusion of the leaves. After a discussion concerning the various glucosides the conclusion is reached that there is only one crystallized digitaline, and that is the French, which has the chemical formula $C_{31}H_{50}O_{10}$. An important fact, which has not been taken into consideration by those investigating the infusion, is that the leaves contain large quantities of calcium and potassium chlorides. The latter is an energetic vaso-constrictor, and the elevation of arterial tension which it produces, even after section of the cord, appears to indicate that it has a local and direct influence upon the muscles in the vessel-walls, and in addition this salt belongs to that class of very diffusible agents which have a great power of filtration through animal membranes, which explains their diuretic action. The calcium chloride also acts upon the heart in that it increases its contractile energy, and, in very large doses, paralyzes it. The presence in the infusion of these very soluble salts, which have a real action upon the heart and cause diuresis, explains, in part at least, the close identity of action of the infusion with the crystalline digitaline, which is absolutely insoluble in water. Besides, we must not forget that the former contains digitaleine, which is soluble in water.—*Journal des Praticiens*, 1896, No. 48, p. 753

Snake-bite Treated by Calmette's Antivenene Serum.—MR. S. J. REX-SIE reports a successful case. A boy of eleven years was bitten upon the inner side of the right foot by a krait (*Bungarus coruleus*), that most deadly and dangerous Indian snake. The leg was promptly bound, and within a few minutes about two drachms of antivenene were injected into the subcutaneous cellular tissue of the boy's abdomen. At the same time the wounds and their

immediate neighborhood were treated with a hypodermatic solution of potassium permanganate, after which they were carefully washed and dressed. The patient never had a bad symptom, and shortly was running about as well as ever. Although the snake was not captured and killed, the testimony of eye-witnesses established its identity.—*British Medical Journal*, 1896, No. 1873, p. 1501.

Recent Observations upon Antitoxin.—DR. LUIGI CONCETTI has treated, within eighteen months, 77 children. In 54 the Klebs-Loeffler bacillus was found; in 2 the examination was negative; in 21 it was not made. The death-rate was 20.77 per cent.; in the 40 hospital patients, 25 per cent.; in the 37 private patients, 16.21 per cent. The causes of failure are due (1) to too late application of the remedy; (2) secondary and concomitant infections (streptococci, staphylococci, diplococci); (3) rapid asphyxia from invasion of the bronchial system; and (4) feeble resistance of the organism from too early age or the presence of other severe diseases (measles, scarlet fever, tuberculosis). Quite likely the parsimony in the use of the serum should be added to this enumeration. Of favorable symptoms, in addition to those usually noted in connection with the use of the remedy, may be cited the retention of the appetite and the ability to sleep. In conclusion, it is stated that the antidiphtheritic serum is perfectly harmless, and its curative powers in the presence of diphtheria are beyond doubt. Further, in a case of extreme gravity that physician is blameworthy who does not make use of this remedy, in the same way that a death from grave malarial infection can be justly ascribed to the physician who omitted the use of quinine altogether or who gave it too late or in insufficient dose.—*Bulletino della R. Accademia Medica di Roma*, 1896, Fasc. vii.

Tincture of Myrrh in Diphtheria.—DR. E. GRAETZER very strongly recommends the internal use of this preparation. The formula is: tincture of myrrh, 1; glycerin, 2; and distilled water to 50 parts. This should be administered every hour during the day and every second hour during the night; in severe cases every half-hour. Under two years the dose is a teaspoonful; to the age of fifteen, a dessertspoonful, and for older patients a tablespoonful. Although local treatment is not considered to be essential, yet it is stated that the recovery was more rapid if, at the above intervals, a gargle of an ounce of chloroform-water (1 to 200) was used with the larger children. Also, the tonsils can be painted with the pure tincture every hour, and in laryngeal diphtheria the first-mentioned solution may be inhaled. Of ten patients all recovered, and although in the last seven cases preparations were made for the use of antitoxin, the improvement was so rapid that injections of it were not necessary. The explanation of the effect of the drug is in its action in increasing the number of white blood-corpuscles or destroying in the affected part the toxin and ptomaine which are there developed.—*Münchener medicinische Wochenschrift*, 1896, No. 47, S. 1164.

The Use of Mercury Cyanate in Diphtheria.—DR. F. LUEDDECKENS reports eighty-one cases with but a single death, and that due rather to simple than to diphtheritic cardiac paralysis. Externally he uses cold wet

combs about the neck or alternating with hot ones. Locally he removes the necrotic material with a dull instrument one to three times daily and paints the entire pharynx with a solution of iron sesquichloride, and follows this with an application of ten drops of a 3 per cent. cocaine solution. If possible, a gargle of potassium chlorate, a teaspoonful to a glass of water, is used, or the mouth is washed at frequent intervals with the same solution. Internally, one or two lemons in sugared water, unirritating diet—the best of all is milk—a laxative, and the drug above mentioned, which can be administered with an antipyretic or an expectorant. A one-hundredth of a 1 per cent. solution is given in teaspoonful doses every hour, and, if gargling is not possible, the dose is retained in the mouth for a short time. The explanation of the action of the drug is not easy to determine beyond its local action in the throat, through which it should be slowly swallowed, and in the stomach and intestine, where it apparently lessens the catarrhal conditions due to the swallowed bacteria and their toxins.—*Therapeutische Monatshefte*, 1896, Heft 11, S. 585.

The Treatment of Tuberculosis.—DR. JOHN WILLIAM MOORE believes that milk, eggs, butchers' meat, and fish should form the staple food for phthisical patients. Should the appetite flag, nourishing light meals should be given at shorter intervals than in health, the invalid being sometimes fed as a fever-patient. Cod-liver oil should be regarded rather as a food than as a medicine. Calcium chloride is a drug of extreme value not less in the preventive than in the curative treatment of phthisis. Fluid extract of conlurango in thirty-drop doses in water relieves the distressing dyspepsia. Vomiting is often relieved by swallowing a cocaine-tablet. Salol and guaiacol carbonate are among the antiseptic remedies which do good in the diarrhoea.—*Therapeutic Gazette*, 1896, No. 11, p. 727.

Tanosol—DR. G. KESTNER presents a brief report of the use of the drug known by this name, which is a synthetic remedy made from tannic acid and creosote. It is an amorphous, dark-brown, very hygroscopic powder, with a slight odor of creosote. Because the powder is volatile it should be dispensed in a solution or as pills. The advantages of the drug are its ready solubility in water, absence of caustic action upon healthy mucous membrane, and its non-interference with digestion. The usual single dose is a tablespoonful of the aqueous solution, containing about nine grains of creosote, and this is to be repeated thrice daily. After a few days double this amount can be taken. The best results were obtained in bronchial affections—marked lessening of the expectoration, diminution of dyspnoea, and increase of appetite. In tuberculosis the customary good results of creosote-administration are found, as above noted, and in addition an increase of weight and diminution in the number of râles.—*Therapeutische Monatshefte*, 1896, Heft 11, S. 609.

The Action and Use of the Thyroid Gland upon the Organism.—DR. A. CHASSIGNAR states that thyroid medication is not inoffensive, and that it should be prescribed with prudence. It has been regarded as a heart-poison which can cause death by syncope (Beclère), and thyro-iodine, isolated from

it, is very poisonous (Notkin) and possesses an excitant action upon the nervous system. Various accidents have been reported—urticaria (Howitz), transient papular erythema (Liache), fatal delirium of persecution (Stabel), glycosuria (Ewald), acceleration of pulse, elevation of temperature, nausea and vomiting (Haskovec), vertigo, malaise, dyspeptic disturbances, somnolence (Chantemesse and Marie). In *résumé*, it has acquired a just reputation in the treatment of myxœdema and of goitre; it may be useful in the treatment of idiots and obese persons in facilitating nutrition-changes; as for other applications, time must determine its value.—*Les Nouveaux Remèdes*, 1896, No. 21, p. 633.

Sparteine Sulphate in Surgical Anæsthesia.—DR. GILBERT GEOFFREY CORHAM calls attention to the facts that in chloroform-anæsthesia (1) fatal cardiac syncope occasionally occurs during the initial stages of anæsthesia, and (2) in prolonged operations, or in operations upon debilitated subjects, marked depression, shown by diminution of pulse-volume and increased rapidity of beat, is of comparatively frequent occurrence. Digitalis, alcohol, and strychnine have been used with varying success, not sufficient to justify their habitual use. From a study of seven cases reported and of others the author concludes that (1) in sparteine sulphate, administered hypodermatically before the commencement of anæsthesia, in the dose of one-tenth of a grain, repeated according to the nature of the operation and the condition of the patient, we have a safe, efficient, and prompt heart-stimulant in chloroform-narcosis. (2) It is not necessary to combine it with morphine or to use it in larger dosage than specified above. (3) Other things being equal, there are less shock and prompter reaction with its use.—*Therapeutic Gazette*, 1896, No. 11, p. 721.

The Dangers from Blisters.—M. COMBY reports an instance which should be a warning against the use of cantharidal vesication in children. The symptoms suggested the existence of meningitis: stiffness of the neck, agitation, delirium, and anuria. Auscultation showed only a few insignificant râles. The temperature was 102.2° F., and the anuria was almost total. These symptoms disappeared after the use of prolonged warm baths and diuretic drinks. After some days of fever convalescence was established.—*Journal des Praticiens*, 1896, No. 46, p. 732.

The Treatment of Typhoid Fever by Internal Bathing.—DR. HENRY DUCHENNE describes this as consisting of (1) obliging the patient to drink as much as he will of inert liquids (teas, slightly acid drinks, weakly alcoholic beverages), and (2) giving a daily lukewarm enema of from one to two pints. For suggestive effect two doses of quinine sulphate of five grains each, and five drachms of a 2.5 per cent. solution of carbolic acid, the latter in the enema. The diet is milk, not bouillon, which is poisonous if the kidneys be affected; nor starches or clear soup, but two, three, or four pints of milk, two or three weak alcoholic drinks, various teas, but never astringents, not even wine. The results are a rapid diminution of the diarrhœa, lowering of the fever, which rarely exceeds 102.2° F. after the fourth

on the twenty-first day of treatment, and convalescence is established upon an average on the twenty-first day. Thirty-five cases are reported, of which two died, one of which was an old alcoholic subject. It is not believed that any other method in country practice could give so low a percentage of deaths.—*Bulletin Général de Théraputique*, 1896, 20e liv. p. 627.

Intestinal Lavage.—DR. E. THERCELIN states that this is indicated in all conditions of intestinal fermentation. For clearing the upper portion of the tract lavage of the stomach and purgatives may be resorted to; afterward the intestine should be washed out as soon as is possible, and this repeated several times daily after each stool. In gastro-intestinal infections of a pyretic type water of a temperature of 77° F. should be used, one or two pints in amount (for nursing-infants), which will lower the body-temperature from one to two and one-half degrees. In the algid type, on the other hand, water at nearly body-heat should be used. In addition to cleanliness and temperature-effects these lavages possess another valuable property—that of assuaging thirst and modifying blood-pressure through the water which is absorbed by the alimentary mucous membrane. In addition, the blood being diluted, the hepatic and renal functions are re-established. The water used may be plain or slightly salted (seven *per mille*). The amount used may be as above for a nursing, or three, four, or even five pints for older children. The contraindications are cardiac disease and intestinal narrowings and ulcerations.—*Revue de Thérapeutique*, 1896, No. 23, p. 709.

The Treatment of Epithelioma.—M. DU CASTEL writes of the treatment of epithelioma, especially of the face, by means of methylene-blue associated with chromic acid. Methylene-blue is irritant and toxic, but we need its irritant and destructive properties in attacking this form of tumor. Its poisonous properties need not alarm us, because fifteen grains per day can be given to a man and there is no likelihood that this amount will be absorbed. The ulcerated surface is cleansed by means of potato-poultices, which have been cooked in a 1 per cent. sublimate solution. Exuberant granulations or cicatricial tissue are touched by the galvanocautery so that the drugs can penetrate to the deepest layers of the disease. The surface is then anesthetized by means of a cotton-compress moistened with a 10 per cent. cocaine solution. The entire surface is now moistened with a tampon saturated with a solution of methyl [methylene] blue 1, in alcohol 5, and glycerin 5. Next an application of an aqueous solution of chromic acid, 1 to 5, is made to the same surface. Above this is applied more of the methylene-blue solution, then the excess of coloring-matter removed, and the above-mentioned poultice again applied. This treatment is repeated four or five times at two- or three-day intervals, until the newly formed skin no longer absorbs coloring-matter. In place of the poultices succeeding the applications, a layer of collodion may advantageously be substituted. The best results are obtained when the disease is superficial. It is useful also to delay further progress in insuperable cases. The reason for the non-absorption of the chromic acid is probably that the methylene-blue determines a serous exudation which prevents absorption of the acid which is afterward applied.—*Bulletin Général de Thérapeutique*, 1896, 22e liv. p. 693.

MEDICINE.

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New Tuberculin Preparations.—R. KOCH. (*Deutsch. med. Wochenschr.*, No. 14, 1897.) There are two kinds of immunity: a toxic, as in tetanus, and a bacterial, as in cholera. The ideal immunity is that in which the body is protected against both the germs and their poisons. The prospect for an immunity in tuberculosis seems unfavorable, yet in miliary and in experimental tuberculosis there seems to be a sort of immunity because at a certain stage of the disease the germs disappear. It has been the endeavor of the author to bring about such immunity early enough to save the individual. In ordinary tuberculosis of the lungs the germs grow slowly, are generally surrounded by necrotic tissue, and are probably only absorbed after having undergone marked chemical change. An immunity is hardly to be expected unless the germs come into direct contact with the living tissues, as in miliary and guinea-pig tuberculosis. All efforts to cause bacilli to be absorbed have failed in the author's hands. The dead bacilli injected caused abscess, and could be demonstrated in the pus for months. Injected into the peritoneal cavity they were somewhat better absorbed, but most of the animals died from the secondary effects of the injection. Injected into the circulation the bacilli caused tubercles in the lungs, but were not themselves absorbed. It was next attempted to make the bacilli absorbable by treating them with acids and alkalis; this was in a measure successful, but no immunity was obtained. The next step was the use of the soluble portions of the bacilli. The use of glycerin gave tuberculin. This has proved of value in the diagnosis of tuberculosis in cattle, and should be used in the same way in men. There is no danger of lighting up quiescent disease, as the author's experience in more than 1000 cases has shown. Tuberculin gives a sort of immunity against the toxin, but none against the germs. Koch has lately directed his efforts to obtaining an immunity against the bacteria. Cultures were extracted for three days in a 1-10 normal NaOH solution with frequent stirring, filtered and neutralized. This solution, known as TA, had the same properties as tuberculin, but was less stable, and was given up. Tubercle-bacilli possess a fatty acid capsule which gives them their peculiar staining-properties and which so protects them from outside influences that they are not absorbed. Koch next tried so to destroy this capsule by mechanical means that the bacilli might be absorbed by the tissues. This was accomplished by rubbing thoroughly dried, young virulent cultures in an agate mortar with an agate pestle. This mass was mixed with distilled water and centrifugated,

the culture and centrifugating repeated with the solid portion until a series of clear fluids was obtained. The first fluid was designated as TO, the others as TR. Both are completely absorbable and non-abscess-forming. The TO contains the substances soluble in glycerin and acts essentially like tuberculin and TA. TR contains the substances not soluble in glycerin and immunizes decidedly. When TR is given it may produce a reaction; this is not necessary to its effect. The author tries to avoid a reaction, but yet to get patients as rapidly as possible immune to large doses of TR, and he thinks against the bacilli, too, as such patients no longer react to tuberculin or to TA. Twenty per cent. of glycerin is added to the preparation for preservation. The fluid is diluted with normal salt-solution before injecting. He begins generally with $\frac{1}{500}$ mg. and increases to 20 mg. With this preparation Koch claims to have completely immunized a large number of guinea-pigs against repeated infection with virulent cultures. Cure of tuberculous animals is only possible if the treatment is begun promptly after the infection; this applies as well to people, where the injections must be made early and before the infection becomes mixed. Koch has treated a number of patients, and claims to have had good results, especially in lupus. Koch is not sure that he has used his preparations to the best advantage, and suggests that a combination with serum might be better. As far as preparations from cultures go, however, he thinks these are the best we can expect to get.

Tricuspid Murmurs; Localization of Systolic Mitral Murmurs.—HEITLER (*Wiener klin. Wochenschrift*, 1897, No. 17) has carefully studied systolic murmurs at the tricuspid and mitral areas. He thinks that tricuspid murmurs are more common than they have been supposed to be, and that his results will essentially modify the usual views as to the distribution of these murmurs. The author's observations have convinced him that the dogma that murmurs of different timbre are different in origin must be abandoned. He holds that murmurs are formed of a mixture of sounds and that these are not transmitted as a whole in all directions, but certain portions are heard in those places where the circumstances for their transmission are most favorable. The part that is well heard along the left ventricle wall differs from that which is well transmitted toward the right. Heitler further denies the dictum that when murmurs are heard in two different areas two murmurs are present, even if the murmur is less loud between the two areas. In one case, where autopsy showed the presence of mitral regurgitation alone, there was a loud musical murmur at the apex, growing fainter toward the base; there was a loud murmur in the aortic area with the same acoustic character as the one at the apex. The same thing may happen in the direction of the base of the sternum. The murmur of mitral regurgitation may be loudest at almost any point to the left of the left sternal border below the second interspace. Less frequently it is loudest in the aortic area, very rarely at the lower part of the sternum. Walshe alone has called attention to the tricuspid as the point of greatest intensity of mitral systolic murmurs. It is of the greatest value to auscult the heart as the contractions weaken. From the disappearance of certain of the murmurs or the appearance of pure tones where murmurs were heard before, an indication of the real origin of a murmur may be obtained.

The statements of authors concerning murmurs in the tricuspid are not very clear. Walshe describes them best: "They are faint and deep, with their greatest intensity over the ensiform process or at its base." Heitler's own work has shown that these murmurs possess striking acoustic characters. They are soft, faint, blowing, rarely rough; more superficial, shorter, and usually higher than the synchronous mitral murmurs. The area of distribution depends upon the intensity of the murmur. The loudest are audible over the entire sternum, generally plainest opposite the fourth interspace, and more distinct over the middle and left half than toward the right side of the sternum. Less frequently is the murmur loudest over the lower part of the sternum. The murmur is conducted to the right and left of the sternum, better toward the left than right. It is usually heard further to the left in the third than in the other interspaces. The fainter murmurs have a more limited distribution both upward and toward the left. They disappear at the level of the third rib; often they are only heard over the lowest part of the sternum and sometimes only over its left half. The diagnosis of tricuspid from mitral murmurs is generally easy, the acoustic properties are so different. The tricuspid murmurs in various diseases of the heart differ only by shades. The author thinks anæmic murmurs having the characters of mitral murmurs are caused by non-closure of the mitral valves, due to widening of the orifice, or weakness of the heart and papillary muscles, and that it is possible in some cases to say to which factor the murmur is due. Murmurs often occur early in disease of the heart-muscle, before any enlargement of the heart can be made out. These are due to disease of the papillary muscles, and are important but not serious signs.

The Alleged Lactic-acid Content of the Urine in Osteomalacia.—HOFMAN (*Centralbl. f. innere Med.*, 1897, No. 14) opposes the view, still held by many, that lactic acid occurs in the urine of osteomalacia. This idea, he thinks, is based upon the claim of C. Schmidt and O. Weber, that lactic acid occurs in the bones of such patients, and upon the improper conclusion that such acid must be at once excreted by the kidneys. Hofman examined the urine of two patients with advanced osteomalacia, using a slight modification of Salkowski's method. The physical character of the urine in both cases was negative, neither contained albumin or sugar. Although large amounts were used, 15 and 20½ litres, no lactic acid could be demonstrated.

The Phonendoscope and the Friction Method.—GROTE (*Münch. med. Wochenschr.*, 1897, No. 10), using a slightly modified form of Bianchi's instrument, agrees with Egger that high-pitched tones are not well transmitted. He thinks, however, that the phonendoscope may have a certain value for faint râles and heart-tones. With Bianchi's method of radial centripetal stroking the author found that the sound began to be heard suddenly, that its character was the same over different organs, and that as the instrument was moved the outline moved in the same direction or changed its shape. This depends simply upon the fact that the friction-tone is heard only when the skin on which the instrument rests is moved by the rubbing. The outlines depend on the strength of the friction, the point of application, and the tension of the skin about the instrument. As the skin became more

ter—the sound became harsher and louder. Grote thinks the apparent coincidence of the phonendoscopic outlines, as obtained by Aufrecht, with the real position of the heart, can be explained by the normal lines of tension in the skin. These run in such a way that if the instrument is placed in the fourth interspace on either side of the sternum one can obtain a somewhat triangular figure with the apex directed out and down, varying in size according to the texture of the skin. That the one on the left side does not necessarily correspond with the heart-area is illustrated by a cut showing the dull area of a dislocated heart lying almost entirely outside the area found by the phonendoscope. Several cuts illustrate the points made.

A Case of Congenital Dextrocardia, with a Contribution to the Application of Roentgen Rays in Internal Medicine.—VEHSEMEYER (*Deutsche med. Wochenschrift*, 1897, No. 12) reports a case of congenital dextrocardia, with a skiagram. The patient was sixteen years of age, undersized, left-handed; upper part of spine slightly curved toward the left. Apex-beat in the fourth interspace to right of the sternum, a little inside the nipple-line. No heart-dulness to left of sternum, but on the right side dulness from the upper border of the third rib, extending half a finger beyond the nipple-line and to the right edge of the sternum. No transposition of the abdominal contents. The heart-tones were pure. In the skiagram the heart-shadow is seen to the right of that of the spine, merging with it. The diaphragm is higher left than right.

The author thinks this may indicate that the weight of the heart has something to do with the normal lower position of the left side, or it may mean that no transposition of the lungs was present, and that the unusual position of the diaphragm was due to the lessened pressure in the left half of the thorax. Congenital dextrocardia is much less common than situs viscerum transversus. The author found twenty-six cases where a clinical diagnosis was made and eleven in which the condition was discovered post mortem.

Hematoporphyrinuria.—NAKARAI (*Deutsches Archiv f. klin. Med.*, 1897, Band 58) examined the urine of 144 patients with 39 different diseases, and found hematoporphyrin ten times. In all the cases (six) of plumbism, in two cases of intestinal tuberculosis with hemorrhage, in one case of rheumatism with pericarditis, and once in empyema after long-continued use of sulphonal. The color of hematoporphyrin containing urine is not distinctive. Nakarai thinks it is a constant symptom in lead-poisoning. It is rare in other diseases, occurring, however, in sulphonal-poisoning and in intestinal hemorrhage. Concerning its origin in normal urine, where it is said to occur in traces, but little is known. Its diagnostic significance in disease, and whether the intestinal hemorrhages in sulphonal- and lead-poisoning are the sole causes for its occurrence in these diseases, cannot yet be determined.

Uric Acid Excretion in Croupous Pneumonia.—DUNN and NOWACZEK (*Zeitschrift für klinische Medizin*, 1897, Band xxxii, Heft 1 and 2) report five cases showing the effect that croupous pneumonia has on the elimination of uric acid. They first review the theories advanced regarding the origin of uric acid in the organism, and refer to the work of Kossel, who showed the

close relationship between uric acid and the xanthin bases. The latter are simply antecedents of the former, containing less oxygen in the molecules and consequently being less highly oxidized products of metabolism. Horbaczewski was the first to show experimentally that uric acid was derived chiefly from the nuclein of the organism. He also demonstrated that if the oxidation of the nuclein be insufficient, xanthin bases and not uric acid resulted. Horbaczewski believed that the cell-nuclei in the body provided the nuclein from which the uric acid is derived, and further believed that uric acid was chiefly derived from leucocytes, which undergo destruction more readily than other cellular elements. He stated that there was a definite relationship between the leucocyte count and the amount of uric acid eliminated, an increase in the former being accompanied by a corresponding increase in the latter. The authors then refer to the work that has been done supporting or opposing Horbaczewski's view. Believing, themselves, that uric acid is derived chiefly from the nuclein resulting from the destruction of leucocytes, they held that diseased conditions associated with purulent exudations, in which this destruction is very marked, should show a marked increase in the excretion of uric acid. Such a condition is found in the resolution-stage of croupous pneumonia, where the products of leucocytic destruction are being constantly absorbed. Accordingly, they determined the uric acid elimination in five cases of pneumonia throughout the course of the disease. In all their cases the amount of uric acid began to increase the day before the crisis set in, and after the crisis suddenly increased so markedly that the amount eliminated was three times as great as during the febrile stage of the disease. This so-called "uric acid crisis" lasted from two to four days. For the next three or four days the amount eliminated gradually diminished, and by the seventh or eighth day after the crisis had once more reached normal. Their results accord with those of Ranke, Gerdes and Kühnau. Dunnin and Nowaczek did not count the leucocytes in their cases, so that it cannot be said that in these cases there is an association between the uric acid excretion and the number of leucocytes in the peripheral blood, as it is well known that the leucocytes usually fall to normal at the time or near the crisis. They believe, however, that their results strongly support Horbaczewski's view that the uric acid excretion is largely dependent on the nuclein derived from leucocyte destruction.

The Influence of Mitral Lesion on the Existence of Pulmonary Tuberculosis.—GRAHAM (*Montreal Medical Journal*, September, 1896) gives statistics compiled by a large number of observers showing the influence valvular lesions of the heart, particularly those of the mitral valve, have on the existence of pulmonary tuberculosis. There is much discrepancy in the results obtained from the statistics and in the opinions of many careful physicians.

In studying the clinical cases two difficulties present themselves: (1) the difficulty in diagnosis between mitral disease and pulmonary tuberculosis; (2) the trouble in deciding which is the primary lesion. French observers have shown that the pulmonary symptoms arising from mitral stenosis may closely simulate those of tuberculosis. Patients with the former may have dyspnea, hemoptysis and emaciation, as well as local consolidation. The pulmonary engorgement may cause an elevation in temperature. Whether

the heart-lesion is primary or secondary can only be decided by a very careful examination into the previous history as to the occurrence of rheumatism or not, or by the actual knowledge of the existence of the heart-lesion previous to the onset of the tuberculosis. The history of cases in which the two have coexisted during the middle period of life shows that the evolution of the tuberculosis was much delayed.

From the statistics and observations of eminent physicians the following conclusions may be arrived at :

(1) That mitral disease and pulmonary tuberculosis rarely exist in the same individual.

(2) That pulmonary tuberculosis is a very frequent sequel to pulmonary stenosis.

(3) The presence of mitral disease acts as a preventive to tuberculosis, especially when the vital powers are at or near their normal standard, and the prophylactic agency is shown in those who have a strong hereditary tendency to the disease, and whose surroundings are of a decidedly unhealthy character.

(4) In the small number of cases in which tuberculosis follows a mitral lesion during middle life its evolution is very much delayed. When, on the other hand, from age or bad habits, the vital powers are on the decline, the process is often as rapid as in ordinary cases.

There are a number of factors present in mitral lesions which may aid in the prophylaxis against tuberculosis :

(1) Increased pressure in the pulmonary circulation.

(2) The presence of transuded serum in the tissues, which renders foreign bodies more easily removed from the bronchial tubes, and which is believed by many to have a germicidal action.

(3) Increase in the involuntary muscular tissue, thus enabling the patient, more especially by coughing, to expel foreign matter from the alveoli and bronchi.

(4) The presence of an increased number of leucocytes in the alveoli.

Graham does not believe that the transuded serum has as marked a germicidal action as it is believed to possess. He states that in cirrhosis of the liver the same exudate exists in the peritoneal cavity, while it is well known that hepatic cirrhosis is frequently complicated by tuberculous peritonitis. He supports the view of Peters, that the passive congestion of the lungs acts as a prophylactic by producing an increased amount of chest measurement, especially at the apices, thus expanding the alveoli, under which circumstances there will be a diminished tendency to the development of tubercle.

The factors which Graham believes are of most importance in the prophylaxis against tubercle in mitral disease are :

(1) The increased amount of blood in the lungs.

(2) The greater expansion of the apices.

(3) The increase of the involuntary muscular fibres of the bronchial tubes and alveoli.

The reason why those who live in high altitudes are less liable to tuberculosis is attributed to the fact that it has been shown that in these persons there is a general hyperemic condition of the lungs which is believed to retard the development of tuberculosis.

SURGERY.

 UNDER THE CHARGE OF

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Symptoms and Treatment of Chronic Suppuration of the Maxillary Antrum.—BARON (*Bristol Medico-Chir. Journ.*, March, 1897) studies with great care the symptomatology and differential diagnosis of chronic suppurative disease of the antrum, and lays the greatest stress upon the positions in which pus will flow from the antrum and from no other sinus. These positions are with the head upon the knees or with the face upon the sound side, where the patient should lie for ten minutes. If pus exists and the drop has been previously removed, a drop of pus will appear at the lower border of the middle turbinated bone. There, of course, may be other conditions existing at the same time, as disease of the anterior ethmoidal cells, cleavage of the middle turbinated, or polypus in the nose.

The author notes the fact that many of these cases are treated as neuralgia. The diagnosis of this condition is never easy, and all symptoms must be considered in their logical sequence.

The treatment is drainage. If there be polypi, hypertrophic rhinitis, deformity of the septum, or any other condition, it must be treated to make the orifice into the antrum normally patulous. A second opening should be made by drilling through the alveolar border after removing an old tooth. Drainage must be maintained by a silver tube, which should be attached to a sound tooth, and antiseptic washings employed.

Septic Peritonitis Treated by Antistreptococcus Serum.—GRANDIN (*Medical Record*, April 3, 1897) reports a case of general suppurative peritonitis in which, after multiple incisions and drainage by multiple packings of gauze and by a large drainage-tube passed into the vagina, the infection yielded only after injections of the antistreptococcus serum.

In regard to the serum the author says: "I am far from claiming that the woman recovered because of the serum. It is always dangerous to draw positive conclusions from a single case. I find that the antistreptococcus serum has been used in many cases, irrespective of the determination as to whether the case of sepsis was due or not to streptococcus infection. The case I report is fallacious in this respect, for I neglected the very essential point of having the pus examined. Etiologically, I should assume that in my case the bacterium coli played a very prominent part, and we know that the antistrep-

serum is powerless against the bacterium coli. If, therefore, the serum entered as a factor in the recovery of my patient, it was because the case was one of mixed infection."

The anti-streptococcus serum appeared to act as follows: temperature and pulse-rate were uniformly lowered after each administration; elimination of waste, infectious products was favored, as was evidenced by the greatly increased action of the kidneys; pus-production was checked; for, whereas before the use of the serum pus-pocket after pus-pocket was forming and infectious elements were being rapidly absorbed into the system, not alone after the injection of the serum did pus-production cease, but the infiltrated flaps cleaned up far more rapidly than the author had ever seen before. He had every reason to anticipate progressive systemic infection and death. He witnessed rapid throwing off of sepsis and recovery.

Effect of the Roentgen Rays on Calculi.—SWAIN (*Bristol Medico-Chir. Journ.*, March, 1897) made an interesting study of the various forms of calculi in relation to their penetrability by the x-rays when outside the body. As a measure he placed coins upon the plate to show absolute opacity. He found by his experiments that the probability of diagnosis by these means is greatest in the oxalate of lime calculus and least in the biliary calculus, phosphatic and uric acid calculi occupying an intermediate position.

In attempting to diagnosticate calculi by the x-rays a shorter exposure may give a better result than a long one. What we have to find out is the amount of exposure necessary for the rays to penetrate the ordinary tissues without completely penetrating the calculus.

The diagnosis of uric acid calculi in the kidney is likely to be a matter of some difficulty; and calculi in the gall-bladder, which give a lighter shadow still, will be even more difficult.

It was found that with a more prolonged exposure the detail of the more transparent objects became more marked, both in negative and print; but at length the negatives, although showing more detail to the eye, became so dense as to be unprintable. This difference between the negative and prints was not observable in the plates taken of living subjects, all these negatives being "thin." It is, however, desirable to see the negatives in all cases, to avoid missing shadows not observable in the print. The author also reports the case of a man from whom an oxalate of lime calculus was removed after it had been detected in a skiagraph.

Successful Removal of a Large Sarcoma of the Brain—DUNCAN and MAYNARD (*Glasgow Medical Journal*, April, 1897) report a rare and interesting case of sarcoma of the brain which they successfully removed.

The patient was thirty-eight years of age, and had had convulsions for three years previous to presenting himself for treatment. The patient had had a chancre ten years previously, however without any systemic manifestations. He was put upon antisyphilitic treatment, and improved so markedly that he was discharged and told to continue his treatment, reporting from time to time. There was not, however, continued improvement, and he entered the hospital, six months later, to be operated upon.

After the dura had been exposed over the fissure of Rolando it was incised,

and a tumor presented itself, which extended further anteriorly. A further portion of bone was removed, when it was found possible to insert the forefinger between the growth and brain-tissue. By gently insinuating the finger the tumor was easily enucleated, except in the region of the dura mater above, to which it was somewhat adherent. There was very little bleeding, but owing to the size of the cavity it was stuffed with iodoform-gauze.

The tumor weighed three ounces; it was oval, measuring three by two and one-half inches, and flattened. It was firmer than brain-substance. The capsule was strong. The tumor was a sarcoma, with rather large round-cells; some were oval.

The site of operation was selected on account of the convulsive twitchings of the left upper extremity, without reference to the pain and tenderness complained of by the patient; the latter proved to be the better indication of the seat of the tumor. The motor area must have been stimulated by the backward pressure of the growth. It was impossible to say from what particular intracranial structure the tumor grew.

The author regrets the use of drainage, as it induced the discharge of the replaced bone-disks, which eventually resulted in a hernia cerebri. The amount of brain-substance thus lost caused a contracture and paralysis of the forearm and a weakness on the left side of the face and in the left foot. The slight fits which the patient still has are probably due to the contracture of the scar. They are not frequent enough to be caused by such a return of the disease as would occur in three years and four months.

Diseases of the Gall-bladder and Bile-ducts.—In a recent lecture delivered at the Royal College of Surgeons in London MAYO ROBINSON (*British Medical Journal*, March 27, 1897) says that in gallstones in cholelithiasis the indications for operation are:

1. In frequently recurring biliary colic without jaundice, with or without enlargement of the gall-bladder.

2. In enlargement of the gall-bladder without jaundice, even if unaccompanied by great pain.

3. In persistent jaundice ushered in by pain, and where recurring pains, with or without ague-like paroxysms, render it possible that the case is gallstones in the common duct.

4. In empyema of the bladder.

5. In peritonitis starting in the right hypochondrium.

6. In abscess around the gall-bladder or bile-ducts, whether in the liver or under or over it.

7. In some cases where, although gallstones may have passed, adhesions remain and prove a source of pain and illness.

8. In fistula, mucous, muco-purulent, or biliary.

9. In certain cases of chronic jaundice, with distended gall-bladder, dependent upon some obstruction of the common duct, although the suspicion of malignancy be entertained. In such cases the increased risk must be borne in mind, as malignant disease may be the cause of the obstruction, and operation in such cases is attended with greater danger than ordinary.

10. In phlegmonous cholecystitis and gangrene, if the cause be seen and recognized at a sufficiently early stage of the disease.

11. In gunshot-injury or in stab-wounds over the region of the gall-bladder.

12. In suspected rupture of the gall-bladder without external wound.

13. In some cases of chronic catarrh of the gall-bladder or bile-ducts.

14. In suppurative cholangitis.

The safest exploratory measure is an exploratory incision followed by palpation of the gall-bladder and ducts, or possibly by aspiration. Aspiration and sounding are dangerous procedures of themselves, as there is the danger of infection of the peritoneum by escaping bile through the puncture of the bladder-wall.

The indications given for cholecystotomy or cholecystostomy are:

1. In all cases where the gall-bladder is sufficiently large to permit of drainage after gallstones have been removed from the gall-bladder or ducts.

2. In cases where there are gallstones in the ducts, but the patient is too ill to bear a prolonged operation, the gallstones being deliberately left for treatment by some solvent solution.

3. In emphysema of the gall-bladder, where that viscus is not too much disorganized to be permitted to remain.

4. In certain cases of chronic catarrh of the gall-bladder or bile-ducts.

5. In suppurative cholangitis.

6. In obstruction of the ducts due to hydatid disease.

7. In dropsy of the gall-bladder.

8. In idiopathic rupture, or laceration, or gunshot-injury of the gall-bladder or ducts.

9. In cases of choledochotomy, in order to avoid tension in the sutured duct.

10. In certain cases of obstructive jaundice dependent on malignant tumor which is occluding the ducts; but in these cases the increased danger must be borne in mind.

11. In some cases of phlegmonous cholecystitis or gangrene, when the patient is too ill to bear cholecystectomy.

After the operation a non-perforated drainage-tube is inserted and the edges of the gall-bladder are sutured to the aponeurotic layer of the abdomen, not to the skin, thus avoiding the danger of fistula. It is preferable to suture the peritoneum of the viscus to the parietal peritoneum when this is possible. In ordinary cases the drainage-tube is shortened on the second and third days and removed on the fourth or fifth.

In cases of contracted bladder that is deeply situated the operation may be difficult. The author has succeeded in some cases by forming a serous tube out of the right border of the omentum surrounding the drainage-tube, or by tucking down the parietal peritoneum and suturing it to the gall-bladder. Where neither of these is possible the packing of iodoform-gauze about the tube is successful.

The Murphy "button-tube," the author thinks, is not often applicable in these difficult cases. In certain cases where the gall-bladder is much contracted the line of incision may be sutured and drainage by iodoform-gauze carried from this line to the abdominal incision, or the incision may be deliberately left patent and the bile allowed to run into the right kidney-pouch, from which it is removed by a drainage-tube in the loin.

The so-called "ideal" operation has the great disadvantage of not allowing drainage of the biliary tract for a time; it is possible to open the gall-bladder, suture it and the parietal incision, and obtain primary union, but drainage does more good.

The operation in two stages does not permit of a thorough exploration of the bile-ducts, as after the healing of the bladder in the parietal incision access to these parts is impossible.

Calculi in the common bile-duct. In some cases it may be impossible to remove stones that have become imbedded in the common duct by forceps or scoop through the gall-bladder. Under the circumstances the stone may be crushed or removed by choledochotomy, or, under certain circumstances, cholecystenterostomy may be performed.

The presence of jaundice with distended gall-bladder is presumptive evidence in favor of malignant disease, but jaundice without the distended gall-bladder favors the diagnosis of cholelithiasis.

The special symptoms which point to stone in the common duct are absence of enlargement of the gall-bladder, with frequent attacks of mild pain followed by jaundice or its intensification, which in many cases never quite disappears. The pain is in the epigastric rather than in the right hypochondriac region, and passes through to the right dorsal or lumbar region rather than to the right infrascapular. Where jaundice is intense and without much variation, especially if the gall-bladder be enlarged, there is usually malignant disease or some other cause than gallstones.

In a few cases a stone may be pressed back into the gall-bladder, but they are seldom found, possibly on account of the contraction of the gall-bladder and cystic ducts. Occasionally a small stone may be pressed into the duodenum, but this is rare, and not infrequently it is pushed into a dilated diverticulum of Vater, and so missed, and the whole operation rendered futile.

Cholecystostomy, with treatment by solvent injections later, is simple and safe, and will give immediate relief with a minimum risk and render the patient better fit for subsequent treatment if it is required.

In cholelithotomy the incision may need to be enlarged so that the stone may be palpated *in situ*. If the right hand be used, the thumb will enter the foramen of Winslow, the index-finger passing in front of the common duct; the position is reversed if the left hand is used. Usually the gallstone flattens out in wafer-shape; the concretion is converted into pulp or breaks up into innumerable fragments, which can be passed on toward the duodenum or subsequently washed through.

The disadvantages of this method are the dangers to the walls of the duct and the return of the stone-formation caused by fragments left behind. Meddling is dangerous from the injury to the walls and subsequent infection.

Choledochotomy is the opening of the bile-ducts for the extraction of gallstones in cases where they cannot be removed otherwise.

Choledochoduodenostomy is a term applied to a modification of choledochotomy where a gallstone is impacted and removed from the diverticulum of Vater through an incision in the duodenum.

Cholecystectomy or excision of the gall-bladder is indicated: 1. In bullet-wounds or other wound of gall-bladder where suture is impossible. 2. In phlegmonous cholecystitis. 3. In gangrene of the gall-bladder. 4. In mul-

4. In perforating ulcers. 5. In chronic cholecystitis from gallstones where the gall-bladder is shrunken and too small to drain safely, and where the common duct is free from obstruction. 6. In mucous fistula due to constriction of the cystic duct. 7. In hydrops of the gall-bladder due to stricture of the cystic duct, as also in certain cases where the gall-bladder is very much dilated. 8. In certain cases of empyema where the walls of the gall-bladder are very seriously deranged, and, 9. in cancer of the gall-bladder. It is contraindicated in all cases of non-patency of the common duct, and it should not be resorted to under the idea that it will prevent the formation of gallstones, as calculi may form in the bile-ducts within the liver or below it.

Cholecystenterostomy consists in establishing an artificial opening between the gall-bladder and intestine, preferably the duodenum.

The author concludes that this operation is indicated:

1. In biliary fistula depending on stricture or other permanent occlusion of the common duct.
2. Very occasionally in cancer of the head of the pancreas or malignant tumor of the common duct, leading to chronic jaundice and distended gall-bladder; but in such cases the mortality will be so high necessarily that the justifiability of the operation is questionable.
3. Occasionally in impaction of gallstones in the ducts, where the patient is not in a fit condition to bear the more prolonged operation of separating adhesions and crushing or removing the concretion by choledochotomy.
4. In certain cases of obstruction of the cystic duct where cholecystectomy is impracticable.

Contraindications. 1. In any obstruction of the bile-duct which can be cleared away with reasonable probability of success.

2. In malignant disease of the head of the pancreas or common bile-ducts leading to distention of the gall-bladder the mortality is so great (8 operations, 7 deaths) that it is hardly worth doing.

3. In contracted gall-bladder where it is impracticable to insert the button.

4. Where there are extensive adhesions which would produce kinking of the bowel.

5. In very large gall-bladders with obstruction of the cystic duct, where cholecystectomy should be done.

The Treatment of the Hypertrophied Prostate by the Galvanocautery.

—BOEFINE (*Archiv für Klin. Chir.*, 1897, Band liv. Heft 1) describes a new method of treating the diuresis accompanying the hypertrophied prostate, which he has perfected and which has produced both in his own hands and in the hands of other eminent surgeons results that are all that could be desired.

He describes the instruments, which he has had constructed according to his own designs, and the technique of the operation, illustrating his subject by the report of three clinical observations.

He claims for the operation the following points:

1. The unmistakable efficiency of the operation—a patient who has not urinated for years passing his urine of himself a few hours after the operation.

2. The harmlessness of the operation even in patients over eighty years of age with foul urine.
3. The permanency of the cure, no case as yet having been known to recur.
4. No post-operative bad effect or effect upon the morale of the patient.
5. The operation is painless and can be done without anesthesia.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF
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Anatomical Defects in the Anterior Palatine Folds.—DR. JAMES E. NEWCOMB contributes (*The Laryngoscope*, 1897, No. 4) an article on anatomical defects in the faucial pillars, noticing that forty-two cases have been published, including three of his own detailed in this paper. These defects, he states, are, according to the last edition of Quain's *Anatomy*, regarded generally as due to incomplete obliteration of the original branchial clefts.

Hay-fever.—DR. W. F. STRANGWAYS (*The Laryngoscope*, 1897, No. 4) attributes the lesion to toxin or toxins which cannot be developed in the acid solutions. He therefore applies acidulated washes, and administers large doses of muriatic acid, well diluted; in some instances as much as one drachm in the twenty-four hours.

Anterior Turbinotomy.—DR. GRANT exhibited two cases of anterior turbinotomy to the Laryngological Society of London (*Proceedings of the Laryngological Society of London*, March 10, 1897), illustrating his method of removing the anterior portion of the lower turbinate body, instead of the whole of it, for obstruction to respiration.

Turbinotomy.—In a paper on "Turbinectomy or Resection of the Middle Turbinate; Report of One Hundred and Twenty Operations," DR. J. A. STUCKY states (*The Laryngoscope*, 1897, No. 4) that a slight hypertrophy of the tissues covering the tip of the bone is sometimes observed after resection of the anterior portion of the turbinate, and that in nine of his cases it was sufficiently excessive to necessitate its reduction, which was accomplished by light touches with chromic acid crystals.

In 62 per cent. of these cases the turbinate was so enlarged as to press tightly against the nasal septum and nearly occlude the middle meatus by contact with the inferior turbinate. They included thirty-five cases of stenosis due to hypertrophy and hyperostosis; forty-eight cases of polypoid degeneration and enlargement of the middle turbinate; three cases of cyst of the

and the process: seven cases of acute frontal sinusitis; eleven cases of suppurative ethmoiditis, and sixteen cases of empyema of the maxillary sinus. He simply states that the addition of an equal proportion of resorcin to the cocaine increases the anesthetic effect of the cocaine and prevents any unpleasant or toxic effects of the drug.

Successful Operation for Sarcoma of the Nose.—MR. H. LAMBERT LACK showed to the Laryngological Society of London (*Proceedings of the Laryngological Society of London*, March 10, 1897) a man, sixty-five years of age, upon whom he had operated for sarcoma of the nose in May, 1895, nearly two years before. The mass had been in the right fossa. In its extirpation the posterior nares were securely plugged first; then the wing of the nose was detached to permit freer access to the mass, and the morbid growth was torn out with polypus-forceps. After this the greater part of the lateral mass of the ethmoid was scraped away, the inner walls of the maxillary antrum and of the orbit being almost entirely removed; and the roof of the cavity was likewise scraped away. The large cavity was packed with iodoform-gauze and the post-nasal plug was withdrawn. The operation had been followed by considerable ecchymosis of the eyelids and cheek, but the patient had made an uneventful recovery and left the hospital in fourteen days. When presented to the Society there was not any sign of recurrence of the disease and there was not any deformity of the nose.

Anterior Epiglottiditis.—Under the heading "Angina Epiglottidea Anterior" DR. W. P. MEYJES, of Amsterdam, reports (*Journal of Laryngology, Rhinology, and Otology*, March, 1897) a case of edema of the anterior portion of the epiglottis in a male subject, forty-one years of age, producing very grave symptoms, which were combated principally by an iced spray of $\frac{1}{3}$ per cent. watery solution of ichthyol every quarter of an hour.

Reference is made to similar cases reported by Michel and by Moritz Schmidt.

Serum-treatment of Scarlatina Sore-throat.—In exhibiting a pharynx from a fatal case of scarlet fever which had been treated with antistreptococcic serum, MR. KINYETT GORDON (*Proceedings of the Laryngological Society of London*, March 10, 1897) stated that, in his opinion, the serum was not of much value in cases where the septic symptoms appeared late and were due to absorption from sloughing tissues, but that he had obtained a strikingly good result when there was septicemia at the onset and the serum had been given early.

The specimen exhibited showed sloughing of both tonsils and ulceration of the uvula. There was a chain of small ulcers extending from the tip of the epiglottis to the pyriform fossa on each side. The rhinopharynx had been full of sloughing adenoid tissue.

Tuberculosis and Syphilis.—DR. E. HARRISON GRIFFIN writes an article upon tuberculosis and syphilis of the larynx (*The Laryngoscope*, 1897, No. 4), in which he states that a tuberculous ulcer and a syphilitic ulcer occur quite frequently side by side. He asserts that syphilis of the larynx is again and

again mistaken for tuberculosis and the diagnosis seemingly confirmed by microscopic examination of tuberculous sputum from coexistence of tuberculous disease of the lung; that syphilis in conjunction with tuberculosis, if both conditions be treated, renders the tuberculous disease less virulent, and prolongs the life of the patient.

He states that these are clinical facts that he has observed again and again when called upon to treat these lesions of the upper air-tract.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Typical Corneal Disease in Aniline-dyers.—SENN describes pigmentations and opacity of the cornea, with destruction of its epithelium, occurring in aniline-dyers. The portion of the cornea opposite the interpalpebral fissure presents a stripe of sepia-brown discoloration about 2.5 mm. in width by 6 mm. in length. The entire region is dull and gives a shimmering, marble-like reflex. The stripe consists of ten or twelve small vesicles, 0.5 mm. in diameter, irregularly placed; these elevations of the epithelium are filled with a clear fluid. Those which have ruptured give rise to shallow depressions. The bulbar conjunctiva shows an intense yellowish-brown discoloration under the form of two isosceles triangles with bases 3 mm. in length at the inner and outer limbus. The corneal epithelium throughout the entire region is very loosely adherent, so that it can be readily lifted off. The affection appears not to occur before the age of forty.

The causes of the disease are undoubtedly the volatile products of aniline oxidation, chinones. These are highly corrosive and discoloring. Abandonment of occupation is the only effective treatment. Special care in ventilation of workrooms and personal cleanliness are necessary to prevention.—*Correspondenzblatt f. Schweiz. Aerzte*, xxiv. Jahrg. No. 6.

Extraction of Senile Cataract.—EBNER (Munich) reports 400 extractions of senile cataract by Prof. Von Rothmund.

Puncture and counter-puncture are made in the sclera, the centre of the section is placed in the corneal margin, usually with the formation of a narrow conjunctival flap. A very small iridectomy is made. Simple extraction is practised only in comparatively young and healthy subjects and if the other eye has been previously operated upon successfully. Soft, traumatic,

and adherent cataracts are extracted outward with iridectomy. Extraction inward is practised if the patient is unable to look down, and on deeply seated globes. Cortex is evacuated by stroking the globe through the lower eyelid after removal of the speculum. Patients are kept in bed five or six days with both eyes bandaged.

From May, 1890, to July, 1896, Von Rothmund performed 458 extractions of senile cataract. For extraneous reasons 58 of these are rejected from the present statistics. Of the remaining 400, of which 25 were complicated, the visual acuity was satisfactory (at least 1/10) in 63.5 per cent.; 1.7 per cent. were total failures. In 60 cases the post-operative astigmatism was found a fortnight after operation to vary from 1.5 to 10 D., with an average of 4.7 D. In 45 patients who returned for examination the vision had improved spontaneously in 42 per cent. Dissection was practised in 46 cases, with improvement of vision in 87 per cent. Cyclitis occurred in 2 cases. Iridodialysis took place in 1 case during operation. In 7 completion of the operation had to be postponed on account of hemorrhage following the iridectomy without detriment to the final result. In 24 cases preliminary iridectomy was practised. Dislocation of the lens while opening the capsule took place in 6 cases. Capsule-forceps were employed eleven times. The lens was extracted with Graefe's scoop in 19 cases. Loss of vitreous occurred in 13 cases, with termination in phthisis bulbi in 1. The largest amount lost was one-fourth of the whole. Corneal infection took place fourteen times, with loss of the eye in 4 cases. Iridocyclitis was noted in 19, twice after discharge from the hospital. In 10 of these the sight was lost. Secondary glaucoma occurred once in a highly myopic eye, with detachment of the retina.

As regards prognosis, while positive response to the usual tests is in general favorable, it does not absolutely exclude disappointments. Thus, in one case with normal function to ante-operative tests, an old detachment of the retina was found after extraction. On the other hand, 5 cases with complete lack of power to recognize colors resulted in good vision and presented no complications whatever. Of 39 cases of hypermature cataract the vision was satisfactory in but 18; in 10 cases of adherent cataract the result was satisfactory in 5.—*Münchener med. Wochens.*, xliv. Jahrg., No. 16.

Pemphigus of the Conjunctiva.—H. D. NOYES (New York) reports the case of an Italian laborer, aged forty-eight years, admitted with symblepharon of both eyes. The first symptom to which he attached importance was that the eyelashes began to turn inward about a year before. The general atrophy of the conjunctiva demonstrated that the entropion was only the extreme stage of a process which had continued for a long time, but was not heeded until serious trouble to sight arose. The lower lids were adherent to the eyeballs, and the lower part of the corneas covered by a dense, glassy membrane continuous with the edge of the lid.

He was submitted to various plastic operations, including skin-grafting and the transplantation of flaps with pedicles, and persistent efforts to keep separated the surfaces of the lids and globe. But all treatment proved ineffective. The cornea grew dull, the part overlaid by thick epithelium became vascular, the clearer central part was soon overspread by vessels and its substance

infiltrated. In the end the whole cornea, save a small spot above, was covered by vascular pannus. Adhesion of the upper lid again took place, drawing the eye upward, while the lower lid likewise became more or less glued to the globe, and nothing which could fairly be called a sinus remained. The patient simply had perception of light.

This case is recorded as an instance of varied and persistent methods of surgical treatment whose result was entirely negative. In these cases the effort to keep the lids and globe separated is not only of no avail, but does mischief. Sight will continue longer if no plastic operations are done.—*New York Eye and Ear Infirmary Reports*, 1897, p. 1.

OBSTETRICS.

UNDER THE CHARGE OF

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Rupture of the Uterus; Abdominal Section; Uterine Suture, followed by Recovery.—PÉE, a practising physician at Altenburg, reports in the *Centralblatt für Gynäkologie*, 1897, No. 12, the case of a patient who sustained a rupture of the uterus during her tenth labor. The presentation was a shoulder, and the physician in attendance endeavored to turn the child, but could not move the head; as the weather was intensely cold and a hospital some distance away, it was thought best not to remove the patient from her home. Abdominal section was accordingly performed and the child extracted, the tear in the uterus extending through the cervix and uterine muscle and separating the broad ligament extensively. The uterus was carefully stitched with fine silk, the peritoneal covering closed with catgut, the abdomen cleansed of blood-clot, and the uterus restored to its normal position. The abdomen was closed without drainage. The patient made an uninterrupted recovery.

The Importance of Retained Fœtal Appendages in Causing Malignant Growth of the Uterus.—In the *Centralblatt für Gynäkologie*, 1897, No. 15, ULESKO-STROGANOWA reports from the clinic at St. Petersburg a case of malignant decidual growth developing in the villi of retained chorion and placenta. Microscopic study of the materials obtained from the uterus showed that the elements of the foreign growth were derived from the villi of the normal placenta. The relations of the cellular elements to the maternal bloodvessels and basement-membrane were identical with those of the normal placenta. The development of free nuclei and cells was characterized by remarkable intensity.

Annales de Gynécologie, April, 1897, AUDEBERT and SABRAZÈS report an interesting case from the clinic at Bordeaux, of a patient who retained her placenta when three months pregnant. The placenta was retained six months longer, and was spontaneously expelled at the normal termination of gestation. A detailed account of this examination is given, with drawings illustrating the growth of its cells. Septic infection did not occur in this case, and as a result it was found that the cells of the placenta developed with extraordinary vigor.* The patient suffered from obstinate vomiting during this time, but had no other sign of toxæmia. The placenta seems to have acted as a malignant growth, and should certainly be treated as such in dealing with these cases. The writers call attention to the necessity for thoroughly cleansing the uterus, by the finger or curette, of all vestiges of the fetal appendages. The microscopic examination of the placenta emphasizes the clinical conclusions of the writers.

The Accurate Measuring of Temperature during the Puerperal Period. SARWEY, from the clinic at Tübingen, gives his results in the *Centralblatt für Gynécologie*, 1897, No. 15, obtained from a careful measurement of temperature in puerperal patients. For twelve years it was customary in this clinic to measure temperature in the rectum, and in round numbers 6400 observations were made. The best time for such investigations was between 6 and 7 in the morning and 5.30 and 6.30 in the afternoon. It is thought that a more reliable temperature is obtained in the rectum than elsewhere in the body. 38.5° C. in the rectum is taken as a normal temperature. During the first twelve hours after birth a rise of temperature is often observed, while normal involution of the genital tract goes on, and no infection can be diagnosticated; this is commonly spoken of as "absorption fever." In other cases a local or general infection can be diagnosticated, which can be referred to the previous labor or the puerperal state. In others a purely accidental cause for fever, not connected with the puerperal condition, is present. It is also necessary to keep accurate record of the height and duration of fever in any patient, and of the number of attacks. In addition, the morbidity and mortality of any clinic may be computed from such records, and diagnosis confirmed by autopsy upon all fatal cases. The writer considers that to obtain strictly reliable records of puerperal cases the methods described must be followed.

A Report of Fifteen Symphysiotomies.—In the *Annales de Gynécologie*, 1897, vol. xlvii., PINARD reports the experience of the Baudelocque clinic for the year ending December, 1896, in symphysiotomy. During this time 25 patients were confined in the clinic who had some pelvic abnormality. Of these, 68 were delivered spontaneously, while in 27 cases operative interference was practised. Of these, 14 were treated by symphysiotomy and extraction.

These cases are narrated in detail, some of the operations having been performed by other members of the staff. Many of the cases were emergencies, the patients having been brought to the hospital after unsuccessful attempts had been made to deliver with forceps. Several of these cases were multi-

An analysis of these operations shows that seven were done upon primiparæ and seven upon multiparæ. In all the presentation of the fetus was vertex. Thirteen of these patients had rachitic pelvis and one had a rachitic pelvis, with luxation of the hip-joint. After the symphysiotomy, 13 of the children were extracted by forceps and one by version. The results were: in 14 cases 12 mothers and 10 children recovered; 2 women and 4 children perished. Of the fatal cases among the mothers, one died of pneumonia, the other died of streptococcus septic infection, autopsies having been held in each case.

The mortality among the children was largely owing to pneumonia, caused by inspiration during prolonged labor.

GYNECOLOGY.

UNDER THE CHARGE OF

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Extirpation of Diseased Adnexa by Abdominal Section.—BLIESNER (*Monatsschrift für Geb. u. Gynäkologie*, Bd. iii. Heft 6; Bd. iv. Heft 1 and 2) prefers the abdominal to the vaginal route for the removal of diseased adnexa, in spite of the brilliant results claimed for the latter. Not only is troublesome hemorrhage often encountered in the vaginal section, but it is sometimes impossible to remove thoroughly all pus-foci. He cites Bardenheuer's method and statistics (7 deaths in 177 cases), who uses dry sepsis and drains per vaginam, extirpating the uterus when necessary.

Hernia of the Ovary.—BIERMER (*Centralblatt für Gynäkologie*, No. 9, 1897), in reporting two cases of hernia of the ovary, takes occasion to review the literature of the subject quite thoroughly.

As regards the etiology, in 78 reported cases the hernia was congenital in 54, being double in over one-half of these. The writer believes that the congenital anomaly is probably due to the fact that when parts of the Wolffian ducts and gubernaculum of Hunter persist the ovaries do not descend into the true pelvis, but through the abdominal wall into the labia majora, the same as the testicles in the male. If this occurs on both sides, double hernia results, the genital organs being otherwise normal. In cases in which there is also an anomaly of the vagina or uterus, the cause is a defective differentiation of the sex at any early period of foetal life. In cases of acquired hernia various causes are assigned, such as undue length of the ligamentum ovarii, broad ligaments, and other peritoneal folds. Symptoms may be entirely absent. In most cases there is sensitiveness in the inguinal region, which may later become an unbearable pain. This pain is most severe a few days before menstruation, and is accompanied by increase in the size of the hernia. The pain may be of such a violent and colicky nature as to simulate incarceration. In obscure cases Schröder's recommendation is

and [unclear] to introduce a sound into the uterus and by moving it to endeavor to [unclear] the ovary, which sign is valueless if the latter is adherent. The writer recommends removal of the affected ovary only if it cannot be reduced and becomes diseased or gives rise to severe pain.

The Relation between the Nasal Mucous Membrane and Menstruation.

— FLEISS (*Centralblatt für Gynäkologie*, No. 4, 1897) calls attention to the fact that swelling and increased sensitiveness of the nasal mucosa, epistaxis, etc., are often noted during menstruation. Pathological changes in this membrane may cause the "nasal" form of dysmenorrhœa, which is temporarily relieved by cocainizing the nose, and permanently, or for a long period, by cauterizing the nasal mucosa. These "genital spots" in the nose (especially the tubercula septi) may become affected in scarlatina, diphtheria, or influenza, soon after puberty; the nasal congestion which appears every month at the time of menstruation may fail to be relieved by the monthly flow. The latter condition is also present during pregnancy. Every month the recurring nasal congestion will be observed, which fails to be relieved by the menstrual flow. The writer claims that the pain during the first stage of labor may be relieved by cocainizing the nose the same as in dysmenorrhœa.

Removal of Intrauterine Polypi by Section of the Anterior Uterine Wall.

— SCHWARTZ (*Sen. Gyn.*; *La Gynécologie*, 1897, No. 2) practises the following operation, which he calls "anterior median hysterotomy: preliminary dilatation of the cervix with laminaria tents, or rapid dilatation with Hegar's bougies, and palpation of the intrauterine growth. A semi-circular incision is then made in front of the portio and the bladder is dissected away as in vaginal hysterectomy. The cervix is then incised in the median line, and, the flaps being held apart with bullet-forceps, the incision is prolonged upward until the interior of the uterus becomes accessible, care being used not to open the peritoneal cavity. The tumor is drawn downward and removed by torsion, morcellation, or section of the pedicle, as may be required. The curette is used if necessary, the uterine cavity tamponed with gauze, and the wound closed with silk or catgut sutures. After repairing the cervical incision the vaginal wound is sutured and a vaginal tampon is inserted.

Colpocystopexy.—DELBET (*Gaz. des Hôpitaux*, January 19, 1897) described the following procedure for the prevention of the vaginal prolapse which often follows hysterectomy for aggravated procidentia of the uterus. A median longitudinal incision is carried from the junction of the cervix and vagina to a point just above the meatus. A second incision is carried around the cervix anteriorly. Two triangular flaps are dissected off on either side, including the entire thickness of the vaginal wall. Hysterectomy is then performed in the usual manner, with ligatures, but care is taken not to include the round ligaments in the latter. The ligaments are divided and their distal ends are drawn down into the vagina, where they are sutured in the vaginal wound, which is closed. The round ligaments thus form a sort of girth which passes under the bladder and ureters, and the anterior vaginal wall is strengthened, the result being even better than that obtained by colporrhaphy, and without the removal of any tissue.

PÆDIATRICS.

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Paroxysmal Tachycardia in a Child.—HERRINGHAM (*Transactions of the Clinical Society of London*, January 8, 1897) described the case of a girl, eleven years of age, who for five years had suffered from sudden attacks of tachycardia coming on without determinable cause and lasting for periods varying from thirty-six hours to thirteen days, subsiding usually during sleep. In the course of the attack the pulse was very small and feeble and ranged from 240 to 260. There was slight præcordial discomfort, but no pain; respiration was accelerated, and there was slight cyanosis, but no anasarca or signs of pulmonary œdema. Before her first attack the child had enjoyed robust health. At the time of observation she presented no sign of valvular lesion, but the volume of the heart was increased, suggesting the possibility of a lesion of the myocardium or pericardial adhesions. In the previous history there was no preceding attack of rheumatism, nor sign of hereditary syphilis. All means of treatment in this case seemed without benefit.

The Red Blood-corpuscle in Icterus Neonatorum.—KOSPFELMACHER (*Wiener medicinische Wochenschrift*, No. 43, 1896, S. 976) has made a study of this subject based upon twelve cases of icterus neonatorum observed in the clinic of Professor Schauta, with the following conclusions: 1. The number of red corpuscles found in the blood of newborn infants during the first week of life is not influenced by icterus. 2. The resistance of the corpuscles at birth is equal to that of the corpuscle in the adult, and is not modified during the first eight days by icterus, even of intense degree. 3. Microscopic examination of the blood of the newborn in the first days of life shows no sign of destruction of blood-corpuscles. It shows, on the contrary, the existence of a very active new formation of the red corpuscles.

Pseudo-bulbar Paralysis in Childhood.—BRAUER (*Deutsche Zeitschrift f. Nervenheilkunde*, 1897, S. 416) records an interesting case under this title in a girl fourteen years of age, who, at the age of eleven months, had a feverish attack with convulsions, which disappeared at the end of some days, leaving a symmetrical paralysis of the tongue and lips, with anæsthesia and dysphasia of mean intensity, and a hemiparesis of the right side with arrest of development of the arm.

At the author's examination there was noted to be a paralysis of the orbicularis oris, of the pterygoids, of the tongue and vulva. The paralyzed muscles showed no atrophy, fibrillary contractions, reaction of degeneration, or disturbances of sensation. The masseteric reflex was exaggerated, the phar-

and reflex waving. The right arm was slightly shorter and weaker than the left. The right leg showed a slight paresis in the muscles supplied by the femoral and peroneal nerves, with exaggerated knee-jerks. The principal symptoms were, therefore, those of a bulbar paralysis, but did not partake of the character of the progressive bulbar paralysis of Duchenné, since muscular atrophy and a slowly progressive course were absent. In the same way, polyn neuritis, foci of inflammation, or softening in the bulb, and lesion of the muscles could be excluded, so that the author concluded that the lesion was supranuclear, or, in other words, that the condition was a pseudo-bulbar palsy.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Summer Diarrhœas of Infants.—In a recent article entitled "A Bacteriological and Anatomical Study of the Summer Diarrhœas of Infants" BOOKER has added much to our knowledge of these disorders, not only as to their etiology, but as to the structural changes in the intestine incident to many of them, which at times prepare the way for general systemic infection.

Careful bacterial examinations of the stools were made in ninety-two different cases of various degrees of intensity, and in the fatal cases similar examinations of the intestinal contents and of the various internal organs were coupled with histological examinations with a view to determining the relation of the intestinal infections and lesions to the remoter changes in the body. As this represents the most exhaustive study of this subject which has yet been made, it seems proper to present the results somewhat in detail.

It was made clearly apparent by the study of the stools that no single species of micro-organism was responsible for the disease, and also, in a general way, that the character of the passages and the nature of the systemic disturbance conform to the character of the intestinal infection. The cases thus arrange themselves in four rather distinct groups.

In a considerable number of the cases the obligatory milk-feces bacteria were found to be the chief bacterial ingredient of the stools. These were for the most part mild cases, of short duration, and usually without apparent toxic symptoms. The stools were sometimes very frequent, were usually acid in reaction, and lacked uniformity of consistence, having been often lumpy. They contained no leucocytes. Twenty-four cases of this type were studied. *Bacillus coli communis* and *bacillus lactis aerogenes* preponderated. Other bacteria when present appeared in very small numbers and were apparently insignificant. In all these cases *bacillus coli* preponderated in the stools over *bacillus lactis*.

In another set of cases, represented by six only of the ninety-two, while

the obligatory milk-feces bacteria were greatly increased in number, the inconstant bacteria of the normal intestinal contents preponderated and appeared to play an important rôle in the induction of the symptoms. Thus, in three of the cases "bacillus a" was the most notable feature, and in one each "bacillus X," "bacillus y," and "bacillus d." It will be remembered that these are the designations applied by Booker to four of the numerous inconstant milk-feces bacteria of infants described by him in a former paper, several of which were found to be pathogenic to animals, and have since been shown by Vaughan to elaborate toxic substances when grown in broth. These cases were all severe and presented evident toxic symptoms. The stools were frequent in some, infrequent in others, and varied much in consistence. They often had a decidedly putrid odor. One of these cases in which "bacillus X" preponderated was fatal.

A third set of cases, comprising thirty-five, was characterized by enormous numbers of bacilli in the stools, among which *proteus vulgaris* was always found in large numbers. The ordinary obligatory milk-feces bacteria were also constantly present in very great excess of the normal, and in many of the cases a few streptococci and some other inconstant forms were also present. As would be expected from the large numbers of bacteria present, these were serious cases, usually chronic if not fatal, and characterized by emaciation and toxic symptoms. The stools were, as a rule, liquid, yellow or green in color, putrid, and neutral or alkaline in reaction. They seldom, however, contained mucus, leucocytes, or epithelium.

In the fourth and last set of cases, twenty-seven in number, micrococci preponderated in the stools, though in addition *bacillus coli* was present in increased number in all the cases, *bacillus lactis* in fourteen, and *proteus vulgaris* in four. The micrococci were for the most part streptococci. These cases were uniformly severe, and gave evidence of marked toxic disturbance. The stools were, as a rule, very frequent, often more than twenty in the twenty-four hours. They were soft or liquid, often greenish, and usually contained mucus and leucocytes in abundance. They were also at times very offensive. Though very numerous, the bacteria were not present in the stools in the enormous numbers met with in the third set of cases. Stained cover-glass preparations also showed them to be chiefly micrococci, not bacilli, as in the former cases. A general pyæmic infection was a not infrequent outcome of these cases.

In connection with these results of bacteriological examinations of the stools the pathological findings in the fatal cases are of great interest. Autopsies were performed in many cases within an hour after death, thus anticipating as far as possible putrefactive changes in the tissues.

Bacterial examinations of the intestinal contents showed a more uniform distribution of the obligatory milk-feces bacteria throughout the gut than is the case in the intestine of the normal milk-fed infant. It will be remembered that attention was drawn by Escherich to the fact that in the normal child the upper part of the small intestine is inhabited almost exclusively by *bacillus lactis*, the *bacillus coli communis* appearing in large numbers only in the lower portion of the ileum, and increasing in number coincidentally with a decrease in number of the *bacillus lactis* as the feces pass downward, until in the colon *bacillus coli* becomes the preponderating species. This relation of the two species is lost in diarrhœal disorders. Both are

us are present in vastly increased numbers in all parts of the intestinal tract, though usually *baecillus coli* would seem to have undergone the greatest increase. In the cases in which *proteus vulgaris* and streptococci were found in the stools during life the same germs were also found in the intestinal contents in large numbers.

The anatomical changes in the intestine and in the internal organs were found to accord in general with the severity of the disease and with the known pathological effects of the bacteria preponderating in the stools in the different cases. In the milder cases and in the majority of those composing the first three groups little or no change was noted in the intestinal mucous membrane, and the change in the internal organs was limited for the most part to parenchymatous degeneration. In the severer cases of the third group, and in most of the fourth set of cases, however, extensive inflammatory and ulcerative changes were present in the intestine, and in these lesions were large numbers of bacteria of the same species as those found in the intestinal contents. In these cases, also, the internal organs frequently showed the existence of serious complications, notably pneumonia, in the lesion of which the same germs again appeared. And even when no visible secondary lesion of this sort was apparent, bacteriological examination invariably in these cases demonstrated the presence of one or other of the intestinal species in at least one of the internal organs.

From these results the conclusion appears to be irresistible that the intestinal disorders of children are to be attributed to no one specific form of bacteria. That in many cases the actual damage is done more by the products of the bacterial growth than by the germs themselves seems clear, since we know that these products are often strongly toxic, and since in many even fatal cases no penetration of the body-tissues by the bacteria can be demonstrated. In the milder forms of these disorders it is not unlikely that the acids which Baginsky has shown are generated by the obligatory milk-feces bacteria in moderate quantity even under normal conditions may be the irritant of the intestinal mucous membrane chiefly responsible for the symptoms, and this conception seems fully in accord with the decided acidity of the stools in these cases. In the severer cases, and particularly when pyogenic or necrotizing species of bacteria are present, distinct inflammatory changes in the intestinal mucosa are usually present and seem often to permit the entry of the bacteria to the underlying tissues, whence they may be disseminated throughout the body and induce a general pyæmic condition of which pneumonia is a not infrequent manifestation.—*Johns Hopkins Hospital Reports*, 1896, vi. 159.

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SOME MOOTED POINTS IN THE PATHOLOGY OF APPENDICITIS,
WITH SPECIAL REFERENCE TO THAT FORM KNOWN AS APPENDICITIS
OBLITERANS.¹

BY JOHN B. DEEVER, M.D.,
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SINCE the time it was determined that the great majority of inflammatory troubles in the right iliac fossa originated in the appendix there have been diverse opinions expressed in regard to the pathology of this affection. Especially has this been true with reference to that branch of pathology which investigates the cause of the pathological changes, viz., the etiology. The anatomical structure of the organ, together with its shape, differences of position, and its general retrograde condition, has been almost universally accepted as the chief *predisposing* cause of this inflammatory trouble. But, when we consider the *exciting* causes we find a great diversity of opinion.

Of the chief exciting factors the presence of a foreign body, such as a seed, cherry-pit, etc., was the one probably first advanced. Other writers claimed that the trouble was due entirely to micro-organisms; others, again, thought that fecal concretions played the most important part.

The idea that a foreign body must necessarily be present has given way before our more complete knowledge of the disease. The theories in regard to the micro-organismal invasion and the presence of fecal concretions have had their ups and downs, until at the present time there is no consensus of opinion in favor of either as a sole cause.

¹ Read before the College of Physicians of Philadelphia, April 7, 1897.

I propose in the paper here presented to show that both theories are tenable, in that both conditions are strong factors in the causation of appendicitis, although as a rule the formation of a fecal concretion precedes the invasion of micro-organisms. I wish to show also the relation of these causes, both of which are known by the course of the disease and by the conditions present at the time of operation to be active in the vast majority of cases.

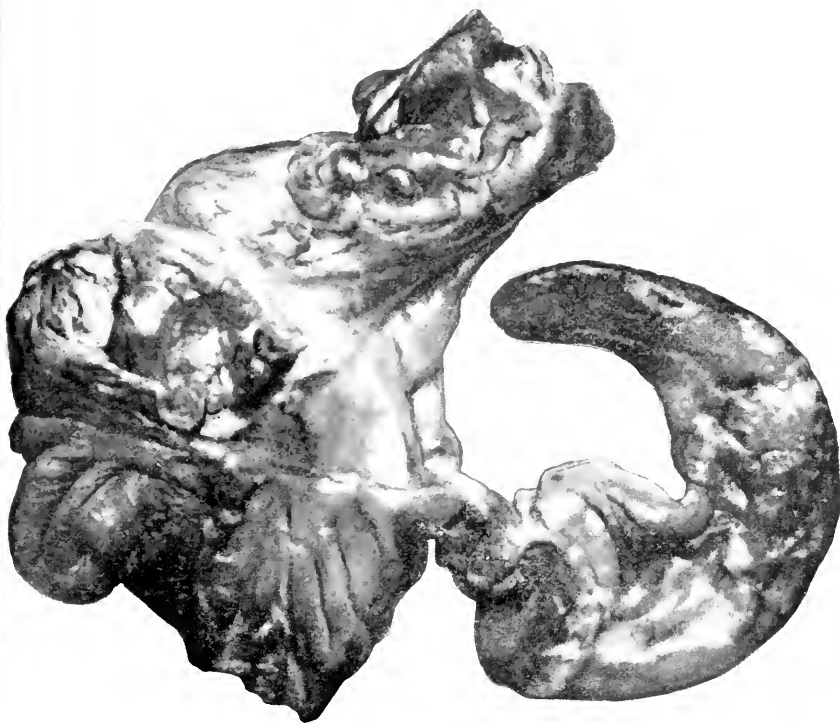
The ideas advanced have been obtained from a study of over 1500 microscopical slides made at the German Hospital, where each case of appendicitis is systematically and thoroughly studied. A full and complete history of the patient's trouble is obtained. A description of the operation is recorded, special note being taken of the position of the appendix, the general direction which it holds, the presence or absence of pus, etc. The organ is photographed immediately after removal, and in many instances an x-ray photograph is also obtained. The appendices are then treated for microscopical work in the usual manner for section-cutting. After the specimens have been thoroughly hardened they are cut into sections of one-half centimetre each, and the diameters of the outside and of the lumen, the appearance of the different coats, and the contents of the lumen are noted. Two or more of these portions are then cut into sections, stained, and permanently mounted. The most interesting are then photomicrographed, and we are ready for a thorough study of the inflammatory trouble.

The few statistics presented have been taken from forty of the fifty cases which have been operated on at the German Hospital since January 1, 1897. These may vary somewhat from the statistics of a full year's work, but I consider them of more interest since they are the result of very recent investigations.

It is probable that every primary attack of appendicitis follows an invasion of micro-organisms. This invasion, on account of hyperemia or deranged circulation of the organ, superinduced by kinks or twists in the mesentery of the appendix, by fatigue, traumatism, typhoid fever, influenza, etc., may take place, in a few cases, through the lymph-channels. In a vastly greater number of cases, however, it occurs through an eroded mucous membrane. The erosion is caused by masses of fecal matter, rarely by a foreign body. Fecal matter is introduced into the lumen of the appendix by contractions of the cecum. The expulsive force of the appendix is not sufficient to expel it, and hence it remains to irritate the mucous layer, at first merely by its presence. The slight muscular movements of the appendix tend to mould the mass into a round or oblong shape. This mass is augmented by the natural secretions of the mucous membrane of the appendix and by further accessions of fecal matter from the cecum. Gradually the concretion increases in size until it irritates by causing pressure against the

walls of the organ. This is followed by a decided erosion of the mucous membrane, and this by an invasion of the micro-organisms which are always present in fecal matter. They proliferate, and the inflammatory troubles then begin. In a few cases the increased secretion of the mucous layer may cause partial liquefaction of the fecal concretion, which may be expelled. In the majority of cases, however, the concretion remains in the lumen, where it is bound to act as an exciting cause of further inflammatory trouble.

FIG. 1.



Separation of base of appendix from its origin from cecum, thus forcing the fecal contents of the latter into the peritoneal cavity.

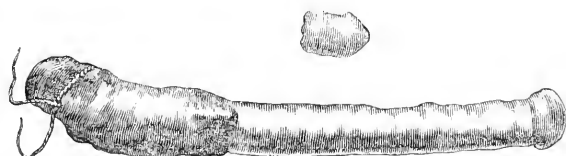
Following the invasion of the micro-organisms we find the general conditions common to any inflammation of the mucous membrane. It must be borne in mind that this invasion takes place only at the site of the dissolution of the mucous membrane, although the micro-organisms are liable to spread rapidly through all the walls of the organ. With the exception of the point of invasion the mucous membrane may be, and often is, absolutely normal and healthy; at other times it shows the effect of inflammation which has extended by continuity of structure.

Almost immediately after the invasion there is an attempt at reconstruction on the part of nature. A round-celled infiltration takes place, with at times a deposition of fibrous connective tissue. Unless interrupted in its course by nature or the surgeon, the process will continue not only through the walls of the organ, but to the surrounding structures, giving rise to that stage of the appendiceal inflammation which is known as para-appendicitis. Here we have to deal with troubles which are known to all operators who have seen many cases that were allowed to take their course. In the first place, there is a bank of lymph thrown out for the purpose of protecting the general peritoneal cavity from infection. In case of an abscess-formation this wall is of the greatest importance in saving the patient from a purulent peritonitis. That an abscess may cause much trouble *per se* if allowed to remain long in the right iliac fossa is beyond dispute. I have seen several cases where the pus burrowed toward the liver, under the limiting membrane, along the iliac vessels into the thigh, etc. This causes at times a condition beyond our power to control. I remember one case in which there was present a large quantity of foul pus which had burrowed under the limiting wall, and formed pockets which could be found only by the most thorough search. Time and again I thought that I had the cavity perfectly clean, but would be confronted by another welling up of the purulent matter from some unknown site. After general septicæmia had ended the patient's life, the post-mortem revealed many other pockets, which had not been reached, hidden beyond the limiting membrane.

The relation of the appendix to this limiting membrane plays a most important part in the prognosis of appendicitis, and on one point I wish to lay special stress. *In a vast majority of cases the limiting membrane does not include or surround the entire organ.* The base, as a rule, is the part left exposed, and I have seen some few cases where a perforation had taken place through this portion of the appendix, with a resulting general purulent peritonitis. The abscess-cavity at the same time remained intact, and but little trouble was found in dealing with it. Since the base of the organ is without the limiting membrane it does not enter into the formation of the wall, nor is it protected by the wall, and, therefore, any pathological change which may take place in that part will necessarily affect the peritoneum in contact with it, and, naturally, the general peritoneal cavity. In most cases this exposed condition of the base does not lead to any untoward effects, but there are other cases in which perforation has taken place with fatal results. (Fig. 1.) Why nature allows this condition of affairs to exist no one can say, but that it does exist cannot be denied. The body of the appendix is generally a constituent part of the limiting membrane, and is thus surrounded by a mass of exudate which prevents it from perforating or causing much trouble. The tip may be within the wall—that is, in the

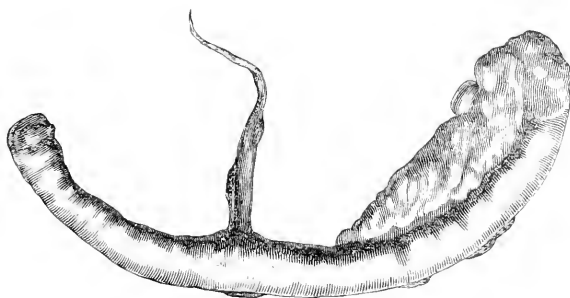
abscess-cavity; or it may be a part of the wall or without the wall—that is, in the general peritoneal cavity. In the latter instance perforation may take place with results similar to those found in perforation at the base—that is, general purulent peritonitis. Perforation does take place from the extreme tip of the organ at times, as is well shown in Fig. 2; but it is generally in those cases which have gone on to a chronic condition, with occlusion of a portion of the lumen of the appendix. These cases I will discuss later.

FIG. 2.



In those cases presenting no pus-formation, but appendiceal peritonitis, we will find adhesions from any portion of the length of the appendix to some of the surrounding structures or to other portions of the organ. These, if allowed to remain in place, play an important part in causing kinks, twists, etc., in the appendix. It is generally known that the adhesions are always more numerous and of greater

FIG. 3.

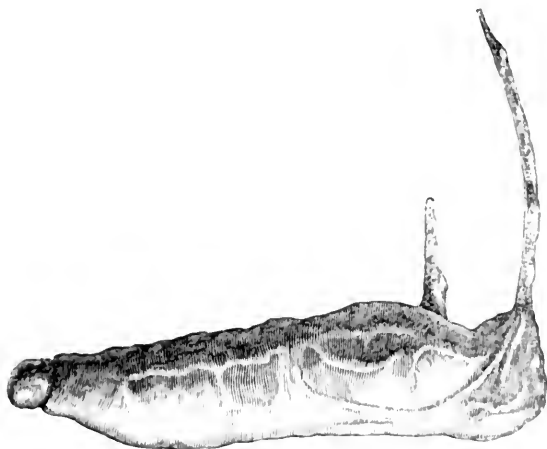


pathological significance in those cases that have been repeatedly visited by the dread inflammation. Some of the adhesions that were formed during the inflammatory condition of the organ are well shown in Figs. 3 and 4. These might well be considered as a fruitful factor in the form of ileus which is caused by a band.

In those cases also where we do not find pus-formation we may meet with one or more of the several following conditions: the condition of the lumen after an attack of appendicitis is such that it is an almost constant cause of further attacks. After the round-celled infiltration

has taken place we find contraction of the tissue which nature has thrown out to repair the damage. This will cause a constriction of the lumen at that point, with, generally, occlusion of the entire calibre. Out of the forty cases that have been operated on at the German Hospital since the first of the year, twenty-five of them were partially occluded—that is, there was a complete obliteration at one or more points in the length of the lumen. This fact alone accounts for many secondary attacks of inflammation and of much suffering in some cases where there is no succeeding inflammatory trouble. As stated, we find the mucous membrane healthy in many parts of the lumen. Should this be the condition of the membrane to the distal side of the obstruction in the lumen, we shall naturally have the secretions and débris thrown out by the mucous layer confined. As the amount increases nature endeavors

FIG. 4.



to expel it. This can be accomplished only by forcing the accumulated material through the obstruction or through the walls of the organ, which, by ulceration, have been weakened and distended. If through the obstruction, there is a tearing asunder of the weakest portion of the constriction—that is, the walls of the appendix are forced apart and the lumen reopened by breaking down of the round-celled infiltration which has completed the occlusion at that point. This is the cause of much suffering on the part of the patient, and accounts for many attacks of severe, excruciating pain with which the possessor of a chronic appendicitis is very often familiar. The pain is caused not by inflammation, to which it has been generally ascribed, but by the pressure on the delicate nerve-endings with which the appendix is well supplied. In these cases there is absolutely no inflammation present at the time of the pain.

This expulsion of contained material may take place time and again, until the barrier has become strong enough to withstand all efforts nature may make to force it open. We then find a condition which will be followed by ballooning of the distal portion of the organ, forming what has been termed a cystic appendix. As long as the walls are strong enough to stand the pressure we will have but few symptoms, except the pain caused by pressure on the nerve-endings. The walls finally become so thin that they rupture, and we then have a peritonitis, abscess, or what not, to deal with. Fig. 5 well shows this condition of ballooning. The illustration is a photomicrograph of a section. While these photomicrographs may not show clearly all the microscopical changes in the organ as a result of inflammation, yet they will answer the purpose of illustration better than any other means I know.

FIG. 5.



Of more significance than the secretions and debris of the mucous membrane are the fecal concretions that are so often walled off in the lumen of the appendix. Of the forty cases, twenty contained fecal concretions. Some of these were confined to the distal side of an obstruction, and, if allowed to take their course, could give but one result—rupture of the organ, with expulsion of the fecal matter into the abdominal cavity. The concretion being too large and too consistent to be forced through the obstruction, must be liberated through the walls of the organ unless the latter be removed from the body. Figs. 6 and 7 show a concretion in section. Of the forty cases seven had ruptured. Foreign bodies sometimes play a rôle in this connection, as Fig. 8 clearly shows. The

illustration is from a blue-print of an x-ray photograph. Near the tip of the organ will be seen a dark spot, which investigation proved to

FIG. 6.



FIG. 7.

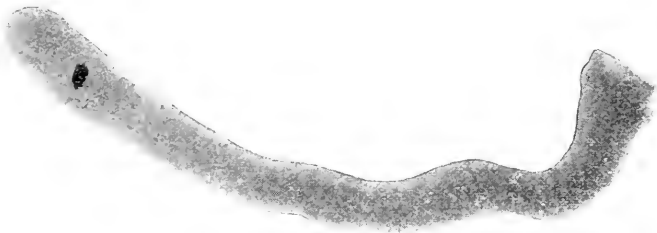


Fig. 7 is a photomicrograph of a section from which the fecal concretion has been removed. It shows dilatation of the lumen and erosion of the mucous coats.

have been caused by a small particle of lead. How it got there is a nice question to decide. It was probably a shot taken into the alimen-

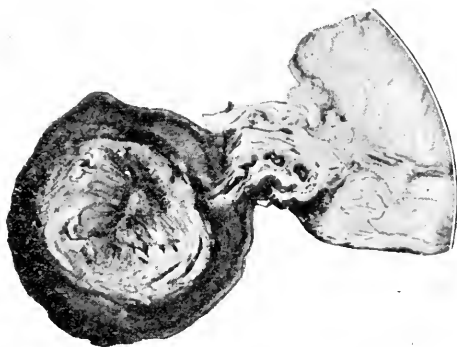
tary tract while the patient was eating game. The illustration does not show it clearly, but just to the proximal side of the piece of lead was a constriction. But one result could have occurred in this instance had the appendix been allowed to remain in the abdominal cavity, viz., rupture at or near the extreme tip.

FIG. 8.



Partial occlusions are often formed in different portions of the same lumen, and several may be found at different points along its length. There is always increased suffering in these cases on account of nature's efforts to expel any contained material. When these occlusions are so

FIG. 9.



numerous that they gradually work together and close the entire lumen we have a condition that has been described by many writers as *appendicitis obliterans*. Examination of appendices removed shows that some of these cases are the result of occlusion that begins at the tip and gradually works its way to the base, pushing before it any material that may

be found in the lumen. Although the result of this process has been termed *appendicitis obliterans*, that term is a misnomer. There is no obliteration of the appendix excepting that small amount which is brought about by contraction and atrophy of the unused organ. What does take place is entire obliteration of the lumen of the organ, but not of the organ itself. But one of the fifty cases operated on this year shows this condition, although I had several of them prior to January 1st. The history of one case from last year may be of interest. Dr. B., aged forty years, had had one attack of acute appendicitis, from which he apparently recovered with little trouble. He noticed, however, that the pain persisted even after he was able to leave his room and attend to his practice. The pain was paroxysmal, excruciating at times, often remittent, but never entirely absent. The appendix was removed; the patient made a good recovery, and has been free from pain since. The pathological examination of the organ showed that the lumen was entirely occluded. There was no evidence of active inflammation. The site of the lumen was replaced by a mass of round-celled infiltration and fibrous connective tissue. Fig. 9 is a photomicrograph of one of the sections, and is a splendid illustration of the condition of the entire lumen. I believe that the pain from which this patient suffered was due to impingement of the small nerve-endings in the appendix, and not to any inflammatory trouble present at the time. I am not sure that these cases can be diagnosticated as such before the operation, although I think there is less tenderness on pressure; that there must be more decided pressure to elicit marked tenderness; and that the patient suffers more constantly than is usually the case.

There is but one other point to which I wish to call your attention, and that is the presence of a circumscribed collection of pus in the walls of the appendix. Three of the forty cases studied showed this condition. It is scarcely necessary to state that recovery from such a condition could be accomplished only by the removal of the organ.

A study of these changes which are wrought in an appendix that has been the seat of inflammation convinces me more decidedly than ever that the sooner such appendix is removed from the abdominal cavity the better it will be for the patient. The pathology is decidedly in favor of removal of the organ, for most cases show a condition that must result in serious trouble to the patient if operation be declined.

I would like to add that no two appendices show exactly the same pathological changes, and that we but seldom find the many sections of any given organ agreeing exactly with each other.

To summarize the examinations of the forty cases, I would state that twenty of them contained a fecal concretion; twenty-five were partially occluded—that is, had an incomplete obstruction at one or more points in the length of the lumen; one was entirely occluded—that is, took that

form generally described as appendicitis obliterans; seven were ruptured; three contained abscess in the walls; one contained a foreign body (a piece of lead).

SERUM DIAGNOSIS. The medical profession has been startled with a new blood diagnosis for enteric fever, and the principles laid down by these discoveries will doubtless lead to wider observations for diagnostic purposes. The experiments of Durham, of London, "On Special Action of Serum on Immunized Animals" (read before the Royal Medical Society of London, January, 1896), show conclusively that special micro-organisms, such as cholera vibrios, colon-bacilli, and typhoid bacilli, produce special forms of immunity in animals by injection of living or dead cultures. Such immune serum, when mixed with pure cultures of the same micro-organism as was used to produce immunity, will show the following reaction: the micro-organisms will lose their power of motility, if motile, and produce clump-formations. Durham's experiments showed that serum immunized by colon-bacilli, when inoculated by active culture of the same species, exhibits reactions of stoppage of motility, clump-formation, and the serum remains clear after twenty-four hours' incubation; control-tests made with normal serum showed no loss of motility, no clump-formation, and the serum became uniformly cloudy. The colon-bacillus was also tested with serum immunized by typhoid and cholera, but showed no loss of motility, no clump-formation, and the serum became uniformly cloudy.

The infections of appendicitis are in a very large proportion due to the varieties of colon-bacilli, sometimes mixed with staphylococcus, streptococcus, and bacillus pyocyaneus. With these facts in mind we have taken the blood from three cases of acute appendicitis with abscess-formation, and have tested the same by the method employed by Johnson in the Widal test. Control-tests were also made with normal blood. It was noted that in each the loss of motility was apparent and that there was slight clump-formation. The cases when operated on showed abscess-formation containing the colon-bacillus in almost pure culture.

Observations in this line are too recent to warrant lengthy records, but I wish to inform the Fellows of the College that special study of the infections in appendicitis is being made, the results of which will be made public. Serum diagnosis may be of value in differentiating typhoid fever from appendicitis, vague abscess-formation, symptoms produced by severe catarrhal conditions, and appendicitis obliterans.

I recently operated upon a child, thirteen years old, in whom the diagnosis of pus was made chiefly from the great degree of tenderness present, and in whom this test had been made, but of which I was not aware. The operation revealed pus. The test showed the colon-bacillus immobile. While I believe this test is a valuable one, yet I would not

be willing, in the majority of cases, to defer operation until the test be made if it would entail much delay, believing, as I do, that delay is too dangerous.

In conclusion, I wish to tender my thanks and credit to the resident staff of the German Hospital, particularly Mr. M. J. Wilbert, Drs. C. Freese, Kalteyer, and Blair, for the work which has rendered this paper possible.

CLASSIFICATION OF ACUTE PERITONITIS.¹

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AN intelligent and systematic discussion of acute peritonitis must be necessarily based on a rational classification. A great deal that has been said and written on this subject from the distant past until the present time is worthless from a scientific as well as a practical standpoint, owing to a lack of a proper classification. The ordinary terms used to designate the different forms of peritonitis are differently interpreted and applied by pathologists and clinicians. Acute inflammation of the peritoneum is produced by so many different causes and assumes such varied clinical aspects that it is extremely difficult to formulate a satisfactory classification. A discussion of the etiology, differential diagnosis, prognosis, and treatment of acute peritonitis except upon the basis of a clear and comprehensive classification is fruitless, misleading, and usually results in the deduction of erroneous and often dangerous conclusions. The classification should include the anatomy, pathology, and etiology of the disease to be of value in rendering a correct diagnosis, a reliable prognosis, and in enabling the physician and surgeon to advise and apply effective therapeutic measures.

1. ANATOMICAL CLASSIFICATION. An accurate anatomical diagnosis is necessary for the purpose of locating the inflammatory process correctly or to trace the connection between it and the organ primarily the seat of infection. During the beginning of the attack and in cases of localized peritonitis the inflammation can usually be located without much difficulty, while the reverse is often the case after the disease has become diffuse. The inflammation may commence and spread from either surface of the serous membrane, visceral or parietal.

(a) *Ectoperitonitis*. An inflammation of the attached side of the peritoneum is called ectoperitonitis. As compared with inflammation of the serous surface, this inflammation of the subendothelial vascular con-

¹ Read before the Congress of American Physicians and Surgeons, May 5, 1897.

nective tissue is characterized clinically and pathologically by intrinsic tendencies to limitation of the inflammatory process. The mechanical and anatomical conditions for diffusion of the infection are less favorable than when the free surface of the membrane is affected. Ectoperitonitis, however, in certain localities may become quite diffuse when the cavity of Retzii (Wm. Gruber) or the retroperitoneal space on either side of the spinal column is the seat of a suppurative inflammation. In the latter locality a paranephric or spondylitic abscess is often the cause of an extended ectoperitonitis, the extent of the disease corresponding with the size of the subperitoneal abscess. In infected wounds of any part of the abdominal wall in which the peritoneum is exposed, but not perforated, the primary ectoperitonitis is occasionally followed by the extension of the infection to the serous surface through the lymphatics, or the direct extension of the infective process through the tissues until it reaches the endothelial lining. Peritonitis of a visceral origin is always preceded by ectoperitonitis, whether the infection reaches the peritoneal cavity through a perforation or by progressive extension of the infection from the primary focus through the tissues until it reaches the free peritoneal surface.

(b) *Endoperitonitis*. What is usually spoken of and described as peritonitis is an inflammation of the serous surface of the peritoneum, which, anatomically speaking, is an endoperitonitis. Endoperitonitis not infrequently leads to ectoperitonitis and the formation of subserous abscesses. In inflammation of the serous coat of the intestine the peritoneum is always loosened and frequently extensively detached by the secondary ectoperitonitis.

(c) *Parietal peritonitis*. Inflammation of the serous lining of the peritoneal cavity is called parietal peritonitis. It may occur as a primary affection in penetrating wounds of the abdomen, but more frequently it is met with as a secondary disease in consequence of the extension of an infection from one of the abdominal or pelvic viscera, or perforation into the peritoneal cavity of a visceral ulcer or a subserous or visceral abscess. Visceral peritonitis is always associated with parietal peritonitis, and parietal peritonitis is only absent in visceral peritonitis when the inflammation remains limited and the parietal peritoneum is protected against infection by plastic exudations. In the female, parietal peritonitis of the pelvic floor usually follows in the course of an extension of an infective process from the internal genital organs through the lymphatics, rupture of a visceral or connective-tissue abscess into the peritoneal cavity, or leakage of septic material from the Fallopian tubes.

(d) *Visceral peritonitis*. Inflammation of the peritoneal investment of any of the abdominal or pelvic organs is known as visceral peritonitis. The inflammatory process is seldom limited to a single organ, as during the course of the disease adjacent organs or the parietal peritoneum will

surely become involved. In diffuse peritonitis the whole peritoneal sac and the serous covering of all of the abdominal organs are affected. The nomenclature of visceral peritonitis is a lengthy one, as it includes all of the abdominal and pelvic organs which, when the seat of a suppurative inflammation, may become the primary starting-point of an attack of localized or diffuse peritonitis. The mesentery and omentum are modified anatomical forms of the peritoneum, and when the seat of inflammation we speak of mesenteritis and epiploitis. Peritonitis involving the serous covering of any abdominal organ, and arising in consequence of an inflammation of the organ which it invests, is designated by the prefix *peri*, and the noun used to indicate the organ primarily affected in a state of inflammation which has given rise to the following terms: peri-gastritis, peri-enteritis, peri-typhlitis, peri-appendicitis, pericolicitis, peri-hepatitis, peri-splenitis, peri-cystitis, peri-salpingitis, and peri-ophoritis.

(*e*) *Pelvic peritonitis*. Inflammation limited to the peritoneal lining of the pelvis and its contents is known clinically and anatomically as pelvic peritonitis. It is an affection almost entirely limited to the female sex, and in the majority of cases is caused by extension of gonorrheal infection from the Fallopian tubes, or a mild form of pyogenic infection from the uterus, its adnexa, or connective tissue of the parametrium.

(*f*) *Diaphragmatic peritonitis*. Inflammation of the under surface of the diaphragm is described as diaphragmatic peritonitis, and when it assumes a suppurative type and remains limited leads to the formation of subdiaphragmatic abscess. This acute localized form of peritonitis is usually secondary to suppurative affections of the liver and gall-bladder and perforating ulcers of the stomach and duodenum.

2. ETIOLOGICAL CLASSIFICATION. The classification of peritonitis upon an etiological basis is of the greatest importance and practical value. The nature of the exciting cause frequently determines the anatomical and pathological varieties. It likewise has a strong bearing upon the prognosis, and often furnishes positive indications as to the methods of treatment that should be adopted. Peritonitis, like every other inflammatory affection, is always the result of infection with pathogenic microbes usually of the pyogenic variety. The etiology must consider the different avenues through which the microbes find their way into the peritoneal cavity.

(*a*) *Traumatic peritonitis*. Primary peritonitis has usually a traumatic origin—that is, the injury establishes between the peritoneal cavity and the surface of the body, or some of the hollow abdominal or pelvic organs, a communication through which pyogenic bacteria enter in sufficient quantity and adequate virulence to cause an acute inflammation. Traumatic peritonitis is most frequently caused by penetrating-wounds of the abdominal wall, the uterus, and lower portion of the esophagus.

In some cases the penetrating wounds of the chest extend into the abdominal cavity through the diaphragm. Contusions and lacerations of the abdominal organs often cause peritonitis by extravasation of the secretions or excretions of the injured organ. Not infrequently the injury is followed by a circumscribed suppurative inflammation in the injured organ, which later is followed by diffuse peritonitis from perforation of an abscess or the injured wall of any part of the gastro-intestinal canal, in which case the peritonitis follows as a secondary affection.

(b) *Idiopathic peritonitis*. The occurrence of peritonitis without an antecedent injury or suppurative lesion is doubted by many. It is an exceedingly rare affection, since pathologists and surgeons have brought by their investigations and observations the peritoneal inflammation with few exceptions in connection with a neighboring or distant primary suppurative lesion. It is certainly much more rare than primary inflammation of the pleura and pericardium. It is too early to deny *in toto* the existence of so-called idiopathic peritonitis, but future bacteriological examinations of the inflammatory product will no doubt reveal a microbic cause in all such cases. Leyden found in a case of primary peritonitis in the inflammatory exudate diplo- and streptococci. As an isolated affection peritonitis is found most frequently in females during or soon after menstruation; it is probable that the pyogenic bacteria multiply in the blood which accumulates in the uterus and reach the peritoneal cavity through the Fallopian tubes. It is said to have occurred in consequence of exposure to cold, and is then known as rheumatic peritonitis. Occasionally it has been observed as one of the remote manifestations of Bright's disease, pyæmia, and the acute eruptive fevers.

(c) *Perforative peritonitis*. Perforation of an ulcer of any part of the gastro-intestinal canal, or of an abscess of any of the abdominal or pelvic organs, or of the abdominal wall into the peritoneal cavity, is by far the most frequent cause of acute peritonitis. Two important and frequent causes are appendicitis and suppurative salpingitis. If localized inflammation develops over the ulcer or abscess before perforation takes place, the general peritoneal cavity is often protected by firm adhesions before the accident occurs, and the peritonitis remains circumscribed. If, however, the contents of the gastro-intestinal canal or the abscess-cavity reach the free peritoneal cavity, a diffuse septic peritonitis sets in, which usually destroys life within from twelve to seventy-two hours unless prompt surgical treatment is resorted to. Experimental research as well as clinical observations has demonstrated that the intestinal wall, when paretic or gangrenous, becomes permeable to the microbes contained in the intestinal canal. In many cases of intestinal obstruction, acute and chronic, death results from septic peritonitis after the intestine has become paretic or gangrenous.

(d) *Metastatic peritonitis*. This form of peritonitis occurs like other

metastatic affections in connection with a suppurative or infectious process disconnected from the peritoneum. It is more rare than metastatic pleuritis, and is seldom seen except as a pyæmic lesion. In very rare cases it develops in the course of many of the acute infectious diseases, as scarlatina, smallpox, erysipelas, rubella, and even varicella. It also occurs frequently in the course of septicæmia and pyæmia. Andral and Desplat have seen it occur during attacks of acute articular rheumatism. It has also been observed in scorbutic subjects and in patients suffering from valvular disease of the heart.

(e) *Puerperal peritonitis*. Peritonitis occurring in connection with septic diseases of the puerperal uterus has for a long time been known as puerperal peritonitis. The infection may extend from the endometrium through the Fallopian tubes, or it follows the lymph-channels, or the thrombosed infected uterine veins. Infection through the lymphatics usually results in rapidly fatal diffuse septic peritonitis, while in thrombophlebitis there is a greater tendency to localization unless the thrombi disintegrate and cause embolism and pyæmia.

(f) *Peritonitis infantum*. Peritonitis attacks most frequently children, young adults, and women during the childbearing period of life, but no age is exempt.

Fatal and intrauterine peritonitis. If the disease attacks, as it occasionally does, the fetus in utero, it often results in death before or soon after the birth of the child; most frequently death ensues during the seventh to the ninth month of gestation. Prenatal peritonitis is frequently associated with syphilis. In most cases the disease is only detected at the post-mortem; in others death, if the child is born alive, is preceded by meteorismus, icterus, and œdema of the legs.

Peritonitis neonatorum. Infection takes place during the first few weeks after birth through the imperfectly healed ulcerating umbilicus. It has been met with most frequently in children whose mothers were afflicted with puerperal fever. Besides peritonitis, symptoms of pyæmia appear.

3. PATHOLOGICAL CLASSIFICATION. The pathological conditions which characterize the different varieties of peritonitis must necessarily be considered in classifying this disease. The pathological classification is based almost entirely upon the gross and microscopical appearances of the inflammatory exudation and transudation.

a) *Diffuse septic peritonitis*. Every acute peritonitis is septic in so far that phlogistic substances reach the general circulation from the inflammatory lesion, and in that frequently the inflammation terminates in suppuration; but the term septic peritonitis should be limited to those cases of diffuse septic peritonitis in which, as a rule, death occurs in a few days, and before any gross pathological conditions have had time to form. It is a disease that is almost uniformly fatal with or without

operative treatment, the patients dying from the effects of progressive sepsis. The claim of operators to have cured such cases by laparotomy must be accepted with a good deal of allowance. The microbes which produce this form of peritonitis are those which follow the lymph-spaces, and are rapidly diffused not only over the entire peritoneal surface, parietal and visceral, but also through the subserous lymphatic channels. The disease is observed most frequently after perforation into the free peritoneal cavity of an abscess containing septic pus, rupture or perforation of any of the abdominal or pelvic viscera containing septic material, gunshot- or stab-wounds of the abdomen with visceral injury of the gastro-intestinal canal, and occasionally as the result of infection during laparotomy. The gravest form of puerperal fever is a diffuse septic peritonitis. The subjects of this variety of peritonitis die so soon after the beginning of the disease that at the post-mortem, or, if the abdomen is opened during life, at the operation, no gross tissue-changes are discovered. Besides a slightly increased vascularity, nothing is found to indicate the existence of peritonitis. The septic material formed in large quantities and of great virulence is rapidly absorbed by the stomata of the under surface of the diaphragm discovered and described by von Recklinghausen.

(b) *Putrid peritonitis*. The inflammatory product in this form of peritonitis is a scanty brown or reddish brown fetid fluid. It occurs most frequently in connection with grave forms of puerperal metritis. It is usually associated with more or less gangrene or ulceration of the organ or parts primarily affected, as uterus, intestine, or abdominal wall.

(c) *Hemorrhagic peritonitis*. The ascites which so frequently develops in consequence of malignant or tubercular disease of the peritoneum is composed of serum frequently stained with blood, but in acute peritonitis the transudate is occasionally hemorrhagic by the tearing of vascular adhesions, and rhesis is also observed in persons suffering from peritonitis who are greatly debilitated, scorbutic, or intemperate, and occasionally when peritonitis occurs in patients suffering from typhoid fever. It is met with most frequently in the pelvis upon the posterior surface of the uterus and vagina, and in men behind the bladder. The inflammatory product appears in the form of brown patches which are composed of delicate and very vascular villi. These villi, from their unfavorable location, are subjected to frequent mechanical disturbances, and when injured bleed, giving rise to the so-called retrouterine or retrovesical hæmatocele.

(d) *Suppurative peritonitis*. Suppurative peritonitis—that is, an inflammation of the peritoneum which results in the formation of pus—is always more or less circumscribed. This form of peritonitis is the most frequent, and is generally associated with more or less fibrinoplastic exudation. The pus is either serous, seropurulent, or may reach the

consistence of cream, when it is usually of a yellow color. The accumulation of pus may be so large that upon opening the abdominal cavity it may appear as though the entire peritoneal cavity and all of the organs contained within were implicated; but a careful examination will almost always reveal the fact that a large part of the peritoneal cavity and many of the organs were shut out from the inflammatory process by plastic adhesions. Suppurative peritonitis must, therefore, be regarded from a practical standpoint as a circumscribed inflammation. The appearance and character of the pus are often greatly modified by the admixture of an extravasation accompanying the perforative lesion which produced the peritonitis. If the pus is thin, serous, we speak of a *seropurulent peritonitis*. It is a serous peritonitis with the formation of pus in sufficient quantity to render the serum more or less turbid. This subvariety of suppurative peritonitis is, without exception, in combination with fibrinous exudations which tend to limit the extension of the infective process. Sedimentation of the solid constituents takes place, so that the fluid contains more of the solid constituents in the most dependent portion of the affected district.

(e) *Serous peritonitis*. Independently of malignant and tubercular disease of the peritoneum, circumscribed hydrops of the peritoneal cavity is caused by a very mild form of peritonitis, the pus-microbes present not being sufficient in quantity to produce pus. Patients usually recover rapidly from this form of peritonitis. The slight alterations of the peritoneum produced by the inflammatory process do not interfere with the transudation of serum, and resorption is effected as soon as the inflammation subsides and the normal absorptive function of the peritoneum is restored. Serous peritonitis is usually more or less complicated by fibrinous peritonitis, as fragments of fibrin are often found suspended in the fluid. The serum is generally somewhat turbid, not transparent, grayish-yellow or reddish in color. As long as the fluid is limited in quantity it gravitates toward the most dependent parts of the abdominal cavity, in the small pelvis; when more copious it reaches the upper portions of the peritoneal cavity, and seeks first the depression on each side of the spinal column.

(f) *Fibrinoplastic peritonitis*. Peritonitis in which plastic exudations are formed and pus is absent or scanty is called fibrinoplastic peritonitis. *Exudative peritonitis* and *peritonitis adhesiva seu sicca* have been used as synonymous terms for this variety of peritonitis. It is usually a secondary process following a primary affection of one of the abdominal or pelvic organs, and denotes a mild form of infection, the extension of which becomes limited by firm adhesions. The inflammation results in a plastic exudation with little or no effusion. The character of the exudate depends on the intensity and quality of the bacterial cause. The exudation is often so copious that it has been mistaken for malign-

nant disease. Goldberg reports two such cases. The symptoms were marked cachexia, ascites, uncontrollable diarrhoea, and apparent tumor deep in the abdomen. The distinguishing features of this form of peritonitis from abdominal tumor are the less circumscribed outline, the less resistance offered, the more regular surface, and the fact that the ascitic fluid is not bloody, but serous or seropurulent. The exudation in the course of time contracts and results in strong bands of adhesion which frequently flex and distort the organs to which they are attached, which has given rise to another term—*peritonitis deformans*.

4. BACTERIOLOGICAL CLASSIFICATION. As the essential cause of peritonitis is always the presence and action of pathogenic microbes and their toxins upon the peritoneum, and as the character of the inflammatory process is largely influenced by the kind of microbes which produced the infection, a bacteriological classification is of the greatest scientific and practical importance. All pus-microbes present in sufficient quantity and virulence in the peritoneal cavity can produce peritonitis. Experiments as well as clinical observation have shown, however, that their action is enhanced by local conditions which favor their growth and reproduction. Injuries or antecedent lesions of the peritoneum and the presence of putrescible substances furnish such predisposing and exciting conditions.

(a) *Streptococcus infection*. The streptococcus pyogenes is the microbe which is most frequently found in the tissues in cases of septic peritonitis. The infection spreads so rapidly over the peritoneal surface and through the subserous lymphatics that death, as a rule, occurs from septic intoxication before a sufficient length of time has elapsed for any gross pathological conditions to form. Absence of fibrinous exudate and effusion is the most striking negative finding at operations and necropsies. Streptococcus infection is the immediate cause of the most fatal form of puerperal peritonitis. Fränkel has found the streptococcus pyogenes in a great variety of puerperal diseases, especially in cases in which the local affection implicated the lymphatic vessels. In such cases the microbes found entrance into the pelvic tissues from abrasions of the vagina or uterus, and by extension of the inflammatory process the broad ligaments and the peritoneum are successively reached. After the peritoneum has once been infected, rapid diffusion takes place, and finally the diaphragm and pleuræ are implicated in the same process, and the patient dies from the effects of progressive sepsis.

(b) *Staphylococcus infection*. In peritonitis caused by staphylococcus infection the intrinsic tendency to localization of the disease is more marked, the inflammation results more often in circumscribed suppuration and limitation of the infective process by copious fibrinoplastic exudations. As a rule, the inflammation terminates in the formation of

thick, cream-colored pus. Different forms of staphylococci are often seen in the same inflammatory product.

(c) *Pneumococcus infection.* It is now well known that pneumonia is produced by different microbes, but the diplococcus is found in about 80 per cent. of all cases. It is this microbe which occasionally is found as the bacteriological cause of acute suppurative peritonitis. Weichselbaum has found the diplococcus of pneumonia unaccompanied by any other micro-organism in three cases of peritonitis. In one case the peritonitis and acute pneumonia occurred simultaneously; in the other, double pleuritis followed the peritonitis; but in the last case the peritonitis was undoubtedly primary, and, in the absence of any other microbes in the inflammatory product, must have been caused solely by the diplococcus of pneumonia.

Etheridge has described three cases of abscess of the ovary complicated by plastic peritonitis, in the contents of which the diplococcus alone was found. Le Gendre reports a case of peritonitis in a girl of eighteen years; the pus was yellowish-green, lumpy, and of a fibrinous consistence, and contained a pure culture of the pneumococcus. The author found altogether eleven cases recorded, eight of which had been fatal. Another case is reported by Veillon. The suppuration caused by pneumococcus infection is almost invariably attended by copious fibrinoplastic exudation.

(d) *Bacillus coli commune infection.* The bacillus coli commune, a microbe that constantly infests the intestinal canal, is in a fair percentage of cases the bacteriological cause of acute peritonitis. This microbe possesses pyogenic properties, and in intestinal paresis and perforations escapes into the peritoneal cavity and produces usually a pathologically mixed form of peritonitis—that is, suppurative and fibrinoplastic peritonitis. In thirty-one cases of peritonitis examined by Fränkel this microbe was found in nine. In eleven cases, seven gave mixed cultures, and in three of these the colon-bacillus predominated. The same author has shown that pure cultures injected into the abdominal cavity of rabbits cause typical peritonitis.

(e) *Gonococcus infection.* In the peritoneal cavity the gonococcus produces a plastic peritonitis, and sometimes localized suppuration. Salpingo-peritonitis and more diffuse pelvic peritonitis are most frequently caused by gonococcus infection. "The proper character and results of the pathogenic activity of the gonorrhœic microbes are, therefore, seen pure and unadulterated in the tubes. They cause purulent inflammation of the mucous membrane, but the surrounding connective tissue remains free from them. The gonorrhœic tubal pus is evacuated into the peritoneum; and, whereas in other conditions the bursting of an abscess into the abdominal cavity is followed by the gravest consequences, in this case the whole process terminates with a circumscribed inflammation

encapsulating the exuded pus. The cause of this difference is the varying pathogenic value of the organisms which are contained in the pus. A puerperal pelvic cellulitic abscess bursting into the peritoneum causes general peritonitis, because it contains pyogenic streptococci, which rapidly multiply in serous cavities and are capable of exerting the most deleterious effects. Gonorrhœal tubal pus cannot do this; its microbes do not find in the peritoneum conditions for their increase; the pus, therefore, acts as an aseptic foreign body, becomes encapsulated, and is finally absorbed" (Sinclair).

(f) *Tubercular infection* The rapid diffusion of the tubercle-bacillus in the peritoneal cavity, either through the circulation or by rupture of a tubercular abscess into the peritoneal cavity, or by extension from a tubercular salpingitis, occasionally gives rise to a form of acute peritonitis characterized as such in a modified way by the clinical manifestations which accompany it. According to the intensity of the infection or the degree of susceptibility of the patient to the action of the tubercle-bacillus, the disease assumes one of the following pathological forms: 1. Tubercular ascites. 2. Fibrinoplastic peritonitis. 3. Adhesive peritonitis. Suppuration only takes place when the tubercular product becomes the seat of a secondary mixed infection with pus-microbes.

5. CLINICAL CLASSIFICATION. From a practical standpoint the clinical classification is the most important. A modern clinical classification must be based on the location, causes, and pathological types of the inflammatory process as outlined above. Upon a correct clinical differentiation between the various forms of peritonitis as seen at the bedside depends largely the adoption of a rational course of treatment. The recognition of the disease no longer completes the diagnosis for the physician and much less for the surgeon. A diagnosis for the careful physician and conscientious surgeon must include the location, extent, causation, and pathology of the disease. From the information gained from the classification already made must be obtained the material upon which to base a clinical classification. Such classification should serve as a guide in differentiating between the cases which demand surgical intervention and the cases which can be trusted to medical treatment.

(a) *Ectoperitonitis*. Abscess-formation in the subperitoneal connective tissue, as seen most frequently in the pelvis in women, in the cavity of Retzius in men, and in the retroperitoneal space in both sexes, is always attended by inflammation of the outer surface of the peritoneum, and is not infrequently followed by extension of the infection through the lymphatic spaces to the free surface, and exposes the patients to the risks of perforation of the abscess into the free peritoneal cavity, septic diffuse peritonitis, and death. Such abscesses should be recognized and accurately located sufficiently early to prevent such serious complica-

tions by an extraperitoneal incision and drainage; or, if the abscess is of tubercular nature, by tapping, evacuation, and iodoformization.

(b) *Diffuse septic peritonitis.* This form of peritonitis is characterized clinically by the gravity of the general symptoms from the very incipency of the disease; pathologically, by the rapid diffusion of the infection over the entire serous surfaces, visceral and parietal; bacteriologically, by the presence in most of the cases of the streptococcus pyogenes in the inflamed tissues. Staphylococci, pneumococci, and the colon-bacillus may also be the cause of rapidly spreading diffuse peritonitis. This form of peritonitis usually follows penetrating-wounds of the abdominal cavity complicated by visceral injuries of the gastrointestinal canal, contusion or laceration of any of the abdominal or pelvic organs, in rupture of an abscess or ulcer into the free peritoneal cavity, or the extension of a septic lymphangitis from any of the abdominal or pelvic organs to the peritoneum. Strict aseptic precautions have succeeded in greatly reducing, but not entirely eliminating the danger from this source in all operations requiring opening of the free peritoneal cavity. In genuine cases of diffuse septic peritonitis surgical intervention is usually powerless to prevent speedy death from toxæmia.

(c) *Perforative peritonitis.* Perforative peritonitis invariably occurs as a secondary affection usually in connection with an ulcerative or gangrenous lesion of any part of the gastrointestinal canal. Perforative ulcer of the stomach or duodenum, or typhoid or tubercular ulcers of the ileum, perforation or sloughing of the appendix, the different forms of intestinal obstruction, are the most frequent cause of this well-defined clinical form of peritonitis. Perforative peritonitis is manifested by the sudden onset of the disease, by diffuse pain and tenderness, rigid abdominal walls, fever, vomiting, the impossibility by inspection, palpation, and auscultation to ascertain intestinal peristalsis, the latter being almost positive proof of the presence of gas in the free peritoneal cavity. According to the author's observations, meteorismus peritonei in perforative peritonitis caused by affections of the appendix is rare, while he has seldom found it absent in perforations of any other portion of the gastrointestinal canal. According to the number and virulence of the microbes which find their way into the peritoneal cavity with the extravasation, the resulting peritonitis is either diffuse or more or less circumscribed. The colon-bacillus is invariably present in the inflammatory product, but in addition streptococci, staphylococci, putrefactive bacilli, the typhoid bacillus, or bacillus of tuberculosis, according to the nature of the primary infection, may also be found.

Perforative peritonitis must be regarded and treated as a strictly surgical disease. The primary lesion must be exposed and treated as soon as a diagnosis can be made and the necessary measures applied to limit the extension of the infection and to prevent death from toxæmia.

(d) *Circumscribed peritonitis.* A circumscribed peritonitis is an inflammation of the peritoneum during which a greater or less part of the peritoneal cavity becomes excluded from the original source of infection by the formation of plastic, visceral, parietal, or visceral and parietal adhesions. The complexus of symptoms varies according to the degree of virulence of the microbic cause, which only occasionally is overshadowed by the primary affection. The symptoms appear suddenly or are preceded by those incident to the primary disease. The severity of the pain and the extent of the muscular rigidity and tenderness will correspond with the extent of the disease. The intensity of the general symptoms is determined more by the nature and virulence of the microbic cause than the size of the peritoneal surface involved. The inflammatory focus may be limited to a very small space, or it may involve the greater portion of the peritoneal cavity and organs which it contains. The clinical course and termination are determined largely by the nature and virulence of the primary bacterial cause, the anatomical location of the primary starting-point, and nature of environment. If the organs adjacent to the primary focus of infection are favorably located to limit the process, diffusion is frequently prevented by the formation of adhesions. This is especially true in cases where the primary infection is limited by the existence of old adhesions.

Localized peritonitis may be confined to the lesser peritoneum, particularly in cases of perforating ulcer of the stomach. More frequently it is caused by appendicitis and cecitis. A very frequent cause of circumscribed peritonitis is inflammation about the gall-bladder, uterus, Fallopian tubes, and ovaries. The localized form of peritonitis is very often overlooked during life. It can usually only be detected if a demonstrable swelling forms at the seat of inflammation. The mildest form of infection gives rise to fibrinoplastic peritonitis, which leaves temporary or permanent adhesions, but terminates without pus-formation. Circumscribed suppurative inflammation is always attended by fibrinoplastic peritonitis; the products of which and the viscera which it involves form the abscess-wall. The microbes which produce most frequently fibrinoplastic peritonitis without suppuration are the gonococcus and the staphylococci. Circumscribed suppurative peritonitis is usually the result of infection with staphylococci, bacillus coli commune, and pneumococci. In fibrinoplastic peritonitis surgical interference becomes only necessary when intestinal obstruction is caused by the adhesions. In circumscribed suppurative peritonitis the pus should be evacuated as soon as the disease is recognized, and, if possible, by an extraperitoneal route.

(e) *Hæmatogenous peritonitis.* In very rare instances peritonitis occurs without any injury or discoverable antecedent lesion of any of the abdominal or pelvic organs, and is then described as idiopathic peritonitis. As peritonitis is always caused by bacteria of some kind, a peri-

tonitis that develops independently of a local source of infection is the result of an infection through the blood, and should be called hæmatogenous or metastatic peritonitis. It has been observed in connection with nephritis, pyæmia, rheumatic arthritis, and acute exanthematous diseases.

(f) *Visceral peritonitis*. A localized peritonitis that can be brought in direct etiological connection with the organ primarily affected is expressed by a compound word with the prefix *peri* and the noun used to indicate the organ primarily affected in a state of inflammation. Thus the anatomical forms of peritonitis present themselves:

Perigastritis,
 Perienteritis,
 Perityphlitis,
 Periappendicitis,
 Pericolitis,
 Perihepatitis,
 Perisplenitis,
 Pericystitis (urinary and gall-bladder),
 Perimetritis,
 Perisalpingitis, and
 Perioöphoritis.

As the mesentery and omentum are only duplications of the peritoneum, we have to add to the above anatomical forms mesenteritis and epiploitis.

(g) *Pelvic peritonitis*. Pelvic peritonitis is seldom met with in the male. It is a form of peritonitis in which the female pelvic organs are the primary starting-point of infection, with extension to the peritoneum, either through the Fallopian tubes or the lymphatics of the uterus or its adnexa. It is caused most frequently by gonorrheal or puerperal infection, or develops after instrumental examination of the interior of the uterus or operations upon this organ.

(h) *Puerperal peritonitis*. By the term puerperal peritonitis is understood a progressive inflammation of the peritoneum occurring in consequence of an extension of an infection from any part of the genital tract in puerperal women after delivery or abortion. The infection usually takes place through the lymphatics, and in the majority of cases terminates in diffuse septic peritonitis.

(i) *Subdiaphragmatic peritonitis*. A peritonitis limited to the under surface of the diaphragm and any of the adjacent organs is called subdiaphragmatic peritonitis. If the inflammation remains limited, and life is sufficiently prolonged, it usually terminates in the formation of a subdiaphragmatic abscess.

SYNOPSIS OF CLASSIFICATION OF ACUTE PERITONITIS.

ANATOMICAL . . .	{	Ectoperitonitis,
		Endoperitonitis,
		Parietal peritonitis,
		Visceral peritonitis,
		Mesenteritis,
		Epiploitis,
		Perigastritis,
		Perienteritis,
		Perityphlitis,
		Periappendicitis,
		Pericolitis,
		Perihepatitis,
		Perisplenitis,
		Pericystitis (urinary and gall-bladder),
		Perimetritis,
ETIOLOGICAL . . .	{	Perisalpingitis,
		Perioöphoritis,
		Pelvic peritonitis,
		Diaphragmatic peritonitis.
		Traumatic peritonitis,
		Idiopathic peritonitis,
PATHOLOGICAL . . .	{	Perforative peritonitis,
		Metastatic peritonitis,
		Puerperal peritonitis,
		Peritonitis infantum,
		Fœtal and intrauterine peritonitis,
		Peritonitis neonatorum.
BACTERIOLOGICAL	{	Diffuse septic peritonitis,
		Putrid peritonitis,
		Hemorrhagic peritonitis,
		Suppurative peritonitis,
		Serous peritonitis,
		Fibrinoplastic peritonitis.
BACTERIOLOGICAL	{	Streptococcus infection,
		Staphylococcus infection,
		Pneumococcus infection,
		Bacillus coli commune infection,
		Gonococcus infection,
		Tubercular infection.

CLINICAL . . . . .	|	Ectoperitonitis,	{	Mesenteritis,
		Diffuse septic peritonitis,		Epiploitis,
		Perforative peritonitis,		Perigastritis,
		Circumscribed peritonitis,		Perienteritis,
		Hæmatogenous peritonitis,		Perityphlitis,
		Visceral peritonitis		Periappendicitis,
				Pericolitis,
				Perihepatitis,
				Peri-splenitis,
				Pericystitis,
	Perimetritis,			
	Perisalpingitis,			
	Perioöphoritis.			
	Pelvic peritonitis,			
	Puerperal peritonitis,			
Subdiaphragmatic peritonitis.				

TROPICAL ABSCESS OF THE LIVER,

WITH A CONSIDERATION OF ITS PATHOLOGY AND CLINICAL HISTORY.

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THE observation, in two small medical services in four months, of four cases of a disease which has been hitherto unrecognized in Cleveland has seemed to us worth calling attention to. It is not improbable that, now that attention is directed to the subject, the disease will be found to be of not uncommon occurrence.

Of our four cases two gave histories of previous chronic diarrhea, the remaining two had diarrhea on admission, one acute and the other chronic. In the cases with diarrhea we did not have an opportunity of examining the stools. Three cases had chronic liver-abscesses, which in two communicated with the right pleural cavity through the diaphragm. In the case with diarrhea of recent date (Case I.) the abscess was evidently acute. In two cases the clinical diagnosis was established by autopsy, in one case by both aspiration and operation,

and in one (Case I.) by aspiration. The *amoeba coli* was found in two cases: in one in the evacuated pus (Case II.), and in one at the autopsy (Case IV.). In Case I., by a mistake, the pus was lost before a microscopical examination could be made. In Case IV. *amoebæ* were found in the liver-abscess in the right pleural cavity and in the pericardial cavity. In this case there was a triple bacterial mixed infection. In Case I. there was evidently a severe bacterial mixed infection, probably streptococcus. It is much to be regretted that an autopsy could not be obtained in this case. There can be no doubt that all these cases are to be regarded as cases of amoebic liver-abscesses secondary to dysentery. In this opinion we are supported by the occurrence of previous chronic diarrhoea in two cases, existing diarrhoea in two cases, the finding of the scars of healed ulcers in the colon of two cases coming to autopsy, and the demonstration of the *amoeba coli* in two cases. All of the patients lived in Cleveland.

CASE I.—Man, aged thirty-six years, laborer, entered the Lakeside Hospital (service of Dr. Powell) May 26th, giving a history of having been severely ill only five days before admission to the hospital. He complained of chills, fever, and profuse sweating and pain in the right hypochondrium near the border of the ribs. Diarrhoea at present not severe; two soft movements daily, containing a large amount of mucus. Has had former attacks of severe diarrhoea; no blood in the stools. The patient suffered from daily chills and profuse sweating, with rapid rises and remissions of temperature.

On June 2d, at 3 A.M., the temperature was 106° in the axilla; at 8 A.M., 93° in the axilla. The frequent chills and rises in temperature, coming at irregular intervals of from twenty-four to forty-eight hours, persisted up to the time of death, which occurred on June 20th.

An autopsy was forbidden. Exploratory puncture in the right hypochondrium, between the ninth and tenth ribs in the anterior axillary line, yielded a pint of grayish-red pus resembling anchovy sauce. Unfortunately, through a mistake, the pus was lost, so that a microscopic examination of it was not made.

For the clinical history of the following case we are indebted to Dr. W. Rogers, with whom the patient was seen in consultation:

CASE II.—O. E., laborer, aged thirty-two years, admitted to the City Hospital May 11, 1895. The patient has been a resident of Cleveland for five years. One and one-half years ago he had a severe diarrhoea with colic and bloody stools. The diarrhoea persisted for two months. During last summer (1894) he had "pneumonia." For the past eight months he has been in a moderately good condition, until a month before admission to the hospital, when he was taken sick with diarrhoea, bloating of the abdomen, and nausea. About the same time a stitching pain in the lower right thorax in the axillary line appeared. At present the diarrhoea is not severe. The patient is very weak, has no appetite, has frequent chilly sensations, sweats profusely at nighttime, expectorates large amounts of mucopurulent sputum, marked dyspnoea. Urine acid; specific gravity 1020; no sugar or albumin.

May 14. Urine acid; specific gravity 1010; no sugar or albumin; amount, 61 oz. in twenty-four hours; urea, 216.5 grains in twenty-four hours. From the physical examination is given the following abstract: patient is emaciated; skin light and clear; face dark; conjunctivæ and mucous membrane of mouth slightly icteroid; tongue red at tip and edges, furred in the centre; pulse, small volume, rapid, low tension; thorax moderately broad and deep; abdomen prominent, especially in the epigastrium; the anterior thorax showed nothing pathological in either the heart or lungs. In the supra- and inter-scapular areas there is no essential difference between the two sides. Over the seventh and eighth ribs in the scapular line on the right side the percussion-note is dull, tympanitic in character. From the eighth rib downward the percussion-note shows an absence of resonance. Over the dull, tympanitic area in the right infrascapular region the inspiration and expiration are bronchovesicular in character. From the eighth rib downward no respiratory sounds are audible.

The liver is uniformly enlarged, reaching three fingers' breadth below the border of the ribs. At the costal border in the anterior axillary line of the right side a friction is palpable and audible, accompanying the respiratory excursion of the liver. The spleen is not palpable, but the percussion-area is enlarged. The liver is sensitive to pressure, but the abdomen is nowhere else sensitive to pressure. During the following week the lower border of the liver ascended nearly two fingers' breadth. The patient was rapidly losing in strength.

On May 20th an exploratory puncture in the ninth intercostal space in the posterior axillary line yielded a thin yellow pus which on microscopic examination showed a relatively small number of well-preserved leucocytes. Large cells answering to the description of amoeba coli were seen in considerable number, though no amoebic movement was seen.

On May 23d Dr. Hobson drained the abscess from the ninth interspace in the posterior axillary line—fully two pints of pus were evacuated; drainage established.

A few days later all the signs of an empyema appeared. The sweats and fever continued. The patient's strength gradually diminished. Death occurred June 11, 1895. Unfortunately, a complete record of the temperature-curve during the entire illness was not preserved. The temperature reached its highest point gradually about midnight, accompanied by profuse sweating. The highest temperature was 104.4°, a remission of five degrees occurring within six hours. From May 20–23d (day of operation) the temperature gradually descended to 98°. For eight days after the operation the temperature ranged from 97.5° to 99°. The last six days of life a subnormal temperature was constant.

Autopsy by Dr. Hoover. Anatomical diagnosis: a large abscess the size of a cocoanut in the upper portion of the right of the liver, with adhesion of the adjacent portion of the liver to the diaphragm and to the abdominal wall. A sinus admitting the point of the little finger connected the abscess-cavity with the right thorax. Acute empyema (2 quarts of thin, gray pus), compression of the right lung, chronic tuberculosis of the apex of the left lung. Limited chronic fibrous peritonitis over the descending colon and sigmoid flexure, with cicatrices; remains of old ulcers on the corresponding internal surface of the intestine. Chronic passive congestion of kidneys and spleen.

The liver-abscess was filled with a thin, grayish-yellow pus. The

walls of the abscess were irregular and ragged and covered with a friable grayish necrotic material. Outside of this there was a thin zone of relatively firm fibrous tissue. The pus in the liver-abscess and in the thorax presented the same appearances.

CASE III.—J. J., male, laborer, aged thirty-two years; admitted to the City Hospital August 31 1895. Parents living and in good health. Three brothers and one sister dead; causes unknown.

The patient says he has never been sick before excepting from excessive drinking. Patient has never been south of northern Ohio. Former occupation was that of seaman on the Great Lakes. His present illness began a week before admission with a tired feeling; headache; epistaxis (not severe); occasional vomiting; insomnia (says he was delirious at times); night-sweats; no pain in the thorax; slight cough; expectorates a small amount of yellowish sputum; has been losing flesh rapidly; pain in the lower abdomen severe. The patient has frequent stools (seven a day), consisting largely of freshly clotted blood. Microscopic examination for amœbæ was negative; urine acid, specific gravity 1014; sugar, albumin, and diazo negative. The patient was seen first by the visiting physician on September 3d, ten days after the beginning of the illness (according to the patient's own account). The following observations were made at that time: the examination of the thorax revealed nothing pathological. The liver encroached upon the right thorax two fingers' breadth in the axillary and scapular lines, and although the hepatic dullness extended three fingers' breadth below the costal border in the nipple-line, the edge of the liver was not palpable. Pressure under the costal border in the right hypochondrium causes pain. In the midaxillary line over the hepatic area a friction-sound is heard during the respiratory excursion of the liver. The sound is not audible in the nipple-line nor at the costal border, and is not palpable. The spleen is palpable on deep inspiration at the border of the ribs. On the following day (4th) the patient was in a state of collapse, so that an exploratory puncture of the liver was impossible. Death occurred during the morning of the 5th.

An autopsy was forbidden, but the following exploratory punctures were made. The ninth intercostal space in the midaxillary line (right side) yielded a small amount of reddish serum which contained a small amount of cell-detritus and a few red blood-corpuscles. In the ninth interspace in the scapular line a moderately thick bloody pus (anchovy-sauce); microscopically a moderate amount of fat-globules; very few well preserved cells—*i. e.*, pus-cells—could be found. The only cells in a state of preservation were a few fatty degenerated liver-cells.

A third puncture in the eleventh intercostal space, posterior axillary line, gave the same result as above. Exploratory punctures were made in the seventh interspace in the nipple-line, at the eighth costal cartilage on the right side, and over the splenic area, with negative results. The search for amœbæ in the pus was negative.

The temperature was as follows: August 31st, P.M., 100.5°. September 1st, A.M., 99.2°; P.M., 101.2°. 2d, A.M., 98.5°; P.M., 100.2°. 3d, A.M., 97.6°; P.M., 100.8°. 4th, A.M., 97.2°; P.M., 100°. 5th, A.M., 97.4°.

CASE IV.—O. W. H., male, aged fifty-four years; occupation carpenter; admitted to City Hospital July 18, 1895. The patient lived in Cleveland twenty years preceding his death, never having been

more than a few miles from the city during the entire time. There is no history of tuberculosis in his family. He denies ever having had syphilis. Had typhoid fever twenty years ago. Has had occasional "rheumatism of his joints," though there are no traces of arthritis at present visible. Drank large amounts of whiskey until two years ago, since which time he has drunk very little. During the preceding fall (1894) he had an attack of severe diarrhea accompanied by colic. This lasted about a month; with the cessation of the diarrhea he noticed that he voided an unusually large amount of urine each day. In a month after the diarrhea ceased he had largely regained his former strength, and with the exception of occasional attacks of pain in the hepatic region (which were accompanied by dyspnea, lasting several days at a time, he was in relatively fair condition until two weeks before admission to the hospital, when severe pain in the right hypochondrium and inferior right thoracic region set in. The pain has been persistent; shortness of breath has also been annoying. While going about he has noticed that the dyspnea increased toward evening, when he noticed occasional slight swelling about the ankles. Patient has slight cough, with slight mucous expectoration. There are two to four loose movements of the bowels a day.

Urine: specific gravity 1020; acid; no albumin or sugar. Physical examination made on July 25, 1895: development good; nourishment poor; small amount of panniculus adiposus; skin harsh and dry; yellowish pigmentation of entire skin. Both inguinal glands and the left axillary glands are about the size of a small hazelnut. No icterus; slight cyanosis. Dilatation of peripheral vessels of both cheeks; no edema; no tenderness or thickening of the long bones. The right lateral vein of the thorax is dilated. Immediately above the umbilicus is a slight protrusion the size of a ten-cent piece which feels much like a coil of veins (*caput Medusæ*). The respiration is largely thoracic in character and increased in frequency. Thorax is moderately broad and deep. The right side in the inferior area is slightly retarded in the respiratory excursion, the difference in the two sides being very slight.

The intercostal spaces in the right hypochondrium are flattened out; in the left side they are retracted. Heart's apex-impulse is visible in the fourth interspace in the nipple line. Pulse has a moderate rate, is rhythmic, regular, small wave; short duration; easily compressible. Atheroma of both radials is pronounced.

Percussion: upper border of the heart is at the third rib in the left parasternal line; left border of the heart in the nipple-line, the right border at the left border of the sternum. The percussion-note in the right supraclavicular space is slightly less resonant than in the left. In the infraclavicular and second interspaces on the two sides there is no essential difference. There are increase of resistance and diminution of resonance toward the base on the right side. The lower border of the lung on the right side is on the fourth rib in the nipple-line, and the fourth interspace in the axillary line; respiratory excursion is present, though diminished in degree. The lower border of the left lung in the axillary line is on the seventh rib.

Posterior thorax: on the right side there are slight increase of resistance and diminution of resonance toward the base of the lung. The lower border is on the eighth rib in the scapular line; on the left side the lower border of the lung is at the tenth rib in the scapular line.

The respiratory sounds are relatively loud over the entire pulmonary area, excepting at the right base, where the intensity of the respiratory and expiratory sounds is much diminished. Nowhere are there any adventitious sounds audible.

Abdomen is protruding, everywhere tympanitic; no free fluid. The right hypochondrium is sensitive to pressure. The hepatic dullness is seven inches in the nipple-line and only two fingers' breadth below the border of the ribs. In the axillary line it measures eight inches. A distinct hepatic border is not palpable, though the movement of the liver on respiration is visible below the costal border. The abdominal wall is tense and resistant.

Splenic dullness is at the eighth rib in the axillary line and extends forward to within two fingers' breadth of the costal border. The spleen is not palpable on deep inspiration.

Hemorrhoids are present; no bleeding at present. The condition of the patient remained much the same without any notable change during the month of August. Being away on a vacation during the latter part of August and first week in September, I was surprised to find on September 6th that the dyspnea had increased, and that from the clavicle downward on the right side the thorax was flat on percussion, with total absence of vocal fremitus and respiratory sounds. The flat percussion-note reached as far as the left border of the sternum above the pre-cardial area. Three pints of bloody pus were aspirated from the right thorax, after which the upper half of the sternum became resonant. The upper right thorax gave slight resonance on percussion and the respiratory sounds were faintly audible.

From this time the patient failed rapidly. He protested against a second aspiration of the thorax. The fluid again increased in quantity. Death occurred on the morning of September 21st.

The temperature during the first five days gradually fell from evening exacerbations to 101° and morning remissions to 99° to a continuous normal temperature. After the empyema was discovered (ten days before death), the temperature was as follows: September 11th, P.M., 99.2° . 12th, A.M., 98.5° ; P.M., 99.8° . 13th, A.M., 96.4° ; P.M., 99.2° . 14th, A.M., 96.4° ; P.M., 99° . 15th, A.M., 96° ; P.M., 95° . 16th, A.M., 95° ; P.M., 94.8° . 17th, A.M., 95° ; P.M., 95.2° . 18th, A.M., 94.8° ; P.M., 94.8° . 19th, A.M., 94.6° ; P.M., 94.6° . 20th, A.M., 94° ; P.M., 95.6° .

The pus aspirated from the thorax was examined for ameba, but none were found. From the history of the patient for the interval during which he was not under my observation it was impossible to determine the date of the origin of the empyema.

Autopsy by Dr. Howard. Anatomical diagnosis: abscess of the right lobe of the liver, with perforation of the diaphragm and empyema of the right side. Chronic pleuritis with retraction of the right lung. Chronic obliterative pleuritis of the left side. Slight chronic morbus Brightii. General heart hypertrophy and dilatation. Acute fibrinopurulent pericarditis. Scars of old ulcers in the colon. Chronic passive congestion of the spleen, kidneys, stomach, and intestines.

Autopsy eight hours after death: body still warm, 170 cm. long, very much emaciated. Subcutaneous fat and muscles wasted. There are no bedsores. The lower portion of both tibiae rough and irregular, and the skin here of a reddish-brown color. There is no jaundice; the skin is very pale.

The right chest and hypochondrium much larger than the left. The abdomen is not distended.

The peritoneum is everywhere smooth, moist; no excess of fluid. The right lobe of the liver extends 5 cm. below the costal margin in the mammary line. The outer border and a considerable portion of the anterior surface of this lobe are bound by firm adhesions to the adjacent abdominal wall. The left lobe is larger than normal. The upper border of the right kidney is firmly adherent to the lower surface of the right lobe.

Chest: both sides free from oedema. The muscles are markedly wasted and pale. On removing the sternum a large amount of blood-stained, thin fluid escapes from the upper portion of the right pleural cavity. The outer layer of the pericardium is firmly bound by adhesions to the adjacent borders of the lungs. The pericardial cavity contains about 100 c.cm. of blood-stained pus. Both the epi- and pericardium are covered with a layer of fibrous material of varying thickness, which is thickest over the surface of the right ventricle. It is readily removed with the finger, and the underlying membrane is congested and shows many points of ecchymosis. The heart weighs 375 grammes. The wall of the left ventricle averages 17 mm. in thickness. The heart-muscle is pale and tears with ease. The valves and the coronary arteries are normal. The aorta is somewhat dilated.

The left lung, firmly bound down by old adhesions, is voluminous, deeply pigmented, and on section oedematous. It is free from tuberculosis. The bronchial glands are pigmented.

The right pleural sac is distended with fluid. In the upper portion of the cavity there is about half a litre of thin, blood-stained fluid. Below this the rest of the cavity is filled with a thick, brownish-red, anchovy-sauce-like pus containing small, grayish, gelatinous-like masses of tissue.

Both layers of the pleura are everywhere covered with a thick layer of fibrous material. On the lower portion of this cavity the costal and visceral pleura, as well as the diaphragmatic layer, are very much thickened. The lung is flattened out against the posterior portion of the chest, and is firm, dense, and airless, and on section is carnified in appearance. There is no communication between the bronchi and the pleural cavity. The bronchi, veins, and arteries are of ordinary appearance.

Through an opening in the central portion of the diaphragm, large enough to admit the hand, the right pleural cavity communicates with an abscess-cavity in the upper portion of the right lobe of the liver.

The lung, pleura, diaphragm, liver, and right kidney removed *en masse*.

On section the greater portion of the right lobe of the liver is found to be the seat of an abscess, which at its lower posterior portion nearly reaches the surface of the organ. At the lower border of this lobe the abscess again reaches the surface, and at this point the upper border of the right kidney is firmly adherent to the surface of the organ. Just above this the transverse colon is adherent to the adjacent surface of this lobe by rather easily broken-down recent adhesions. There is no apparent relation between the colon and the liver-abscess. The thickness of the hepatic tissue between the wall of the abscess and the surface of the organ varies in different places from 0.5 to 7 cm., the thinnest places being near the upper and the posterior surfaces.

The wall of the abscess is in general ragged and irregular. The superficial layer is soft, easily broken down under the finger, grayish-white in appearance, and varies from 0.5 to 2 cm. in thickness. Beneath is a firmer zone of a peculiar gelatinous appearance and consistency. Outside of this there is a fibrous tissue zone of a varying thickness. The liver-tissue about this is pale and firm. The left lobe is larger than ordinary. The surface is smooth; the capsule is not thickened. On section the surface is pale and has a nutmeg appearance. The consistency is not increased. No other abscess was found. The liver measures 28 x 20 x 16 cm.

The spleen is considerably enlarged and weighs 350 grammes. The surface is smooth and free from adhesions. The capsule is not thickened. On section the tissue is soft and dark red in color. The trabeculae are visible; the Malpighian bodies are obscured.

The kidneys are of about the same size and general appearance, and somewhat smaller than ordinary. The capsules are lightly adherent in places. On the surface of the left there are several small cysts. The cortices are somewhat thinned. The consistency is not specially increased. The arteries are normal. The renal pelves, the suprarenal bodies, bladder, penis, and testes are normal. The pancreas is normal, as are the pharynx and œsophagus. The mucous membrane of the stomach and small intestine is deeply congested. There are no scars or ulcers in the small intestine. In the rectum, sigmoid flexure, and the ascending colon there are numerous firm scars, but no fresh ulcers. About several of these scars the muscular coat is thinned.

Microscopical examination of the pus from the right pleural cavity, the liver-abscess, and from the pericardium shows large numbers of amœbæ, many of which are actively motile. They vary in size from 30 to 40 and even 50 μ in diameter. In the finely granular protoplasm of many a nucleus can be made out; many contain red blood-corpuscles and pigment; few contain bacteria. Scrapings made from the pleura and pericardium show large numbers of polymorphous nuclear leucocytes, many of which contain fine fat-drops.

In the pus from the liver-abscess no leucocytes are seen. There are a few red blood-cells, some markedly fatty liver-cells, and a few amœbæ. Most of the material is made up of granular detritus. Scrapings of the wall of the abscess contain more amœbæ than the free pus.

Stained cover-slip preparations made from the liver-abscess and from the pus from the pleura and pericardium show small numbers of diplococci, a short, stout bacillus, and a long, thin bacillus. They are more numerous in the pus from the pleural sac than from the liver-abscess or from the pericardium.

In cultures made from the pus from the liver-abscess and from the pleural and pericardial pus there developed colonies of the colon-bacillus and the staphylococcus pyogenes aureus. The cultures made from the spleen and kidneys remained sterile.

Fresh frozen sections of the heart-muscle show a well-marked fatty degeneration.

Microscopical examination of sections made from various portions of the wall of the liver-abscess and stained in hæmatoxylin and eosin shows in all practically the same characters. The inner zone nearest the abscess-cavity is made up of a layer of varying depth composed largely of a granular structureless material that stains rather diffusely with

both hematoxylin and eosin. In this material there are irregularly scattered areas composed of small round cells with round or oval nuclei, and a smaller number of spindle-shaped cells. The round cells predominate. The cells extend in some places deep into the underlying tissue, but in other places they are confined to the margin of the abscess-wall. In this zone, in its superficial portion, here and there a few large cells can be made out—amoebæ. Beneath this zone of necrosis there is a broad band of fibrous tissue very poor in cells. In places the necrotic zone extends into this layer. In the outer portion of the fibrous tissue layer there are a few bands or single rows of elongated liver-cells to be seen. There are here and there also many small bile-ducts made out. Outside the fibrous tissue zone the liver-cells are compressed and have lost their shape. The acini can nowhere be made out. The liver-cells are very much elongated and flattened. They contain large amounts of pigment. Just under the fibrous tissue zone many have lost their nuclei and stain poorly. The capillaries are small and often cannot be made out. The portal systems are prominent and the connective tissue about them is markedly increased. Scattered in the liver-tissue there are larger and smaller bands of fibrous tissue. The smaller bands contain a large number of small round cells and the neighboring liver-cells stain poorly, and many of them have lost their nuclei. In sections that reach the surface of the liver the capsule is seen to be markedly thickened and the compression of the liver-tissue extends throughout the sections. There are no areas of definite necrosis or of abscess-formation in this zone of liver-tissue about the abscess-wall. No amoebæ are to be seen. In some sections where the margin of liver-tissue between the abscess-wall and the surface is thin there are small areas of necrosis of liver-cells to be seen. These areas stain diffusely with eosin, and are composed of a hyaline structureless material. In some places there is a diffuse growth of connective tissue, chiefly in the perivascular spaces along the capillaries between the liver-cells. Here the liver-cells are few, and those remaining form flattened elongated bands. The capillaries contain little blood, but the larger portal ones are congested.

Sections stained in methylene-blue and eosin give a clear picture of the abscess-wall. The granular material in the necrotic zone stains diffusely with the eosin. In places along the inner border there are seen numbers of cells, often in clumps, but here and there scattered cells are seen. The most part of these cells are small round cells with single round nuclei and spindle-shaped cells; but here and there masses of polymorphous nuclear leucocytes are seen. In some places numerous red blood-cells are found. In the necrotic material along the free margin of the abscess-wall and sometimes deeper in the tissue there are numbers of bacteria. The most numerous are short, stout bacilli with rounded ends, lying scattered and in masses. Some longer, thinner bacilli are also seen. These also often lie in masses, usually near the surface of the necrotic layer. Scattered in the necrotic material, usually in the areas of leucocytic infiltration, diplococci are seen. These are less numerous than the other forms. The bacteria in some places are found at the border between the necrotic material and the fibrous tissue zone of the abscess-wall.

In one section the epithelium of a large bile-duct is swollen, desquamated, and the lumen is nearly filled with cells.

In the sections stained with methylene-blue and eosin amœbæ can be clearly made out. They are more numerous in some sections than in others. They are only found in the necrotic layer, and are nowhere in great numbers. They vary in size from 10 to 25 μ . They are usually round or oval in outline. Some are stained deeply with eosin, the nucleus being stained somewhat more deeply than the rest of the organism. Others stain rather diffusely but lightly with methylene-blue, the nucleus being stained a darker blue than the rest. In many of the amœbæ vacuoles are seen. At no place can amœbæ be found invading the fibrous tissue zone of the abscess-wall, and they are not found in the capillaries or veins of the liver-tissue.

Pleura: the changes in the pleura are of a much more active inflammatory character than those met with in the liver-abscess. The pleura is covered with a thick exudation, very rich in fibrin and polymorphous nuclear leucocytes. Some of the cells are broken down and have lost their nuclei. In places there are numbers of deeply staining nuclear fragments to be seen. In sections stained by Weigert's method and in methylene-blue and eosin many bacteria are seen. They are mostly diplococci. Besides these there are short, stout bacilli, and longer bacilli similar in size and shape to those described in the wall of the liver-abscess. They are met with chiefly on the surface of the exudation. The diplococci can be traced deep into the exudation and reach the pleura proper. At the border between the exudation and the underlying pleural tissues in most places the pleural cells are absent, and the tissue is infiltrated with small round cells and polymorphous nuclear leucocytes. In places the pleural cells have proliferated, and numbers of them can be seen in the deeper layers of the exudation. The bloodvessels of the subpleural tissues are markedly dilated and congested. In the underlying lung-tissue the air-cells are collapsed and their walls lie in juxtaposition. The lung-tissue is congested and here and there are seen masses of pigment. On and near the exudation a few sparsely scattered amœbæ can be made out. They are not found deep in the exudation or near the pleura. None can be found in the lung-tissue.

Pericardium: sections made from the pericardium over the surface of the right ventricle, and stained with methylene-blue and eosin, show the presence of a fibrinous exudation. In this there are not a great number of leucocytes. The bloodvessels of the endocardium are deeply congested. In the exudation large numbers of cocci are seen. Besides, there are a few long bacilli and some short, stout bacilli. In places the lining cells of the epicardium are swollen and desquamated. In the exudation, besides these cells, there are larger ones, staining like the amœbæ in the liver-abscess and of the same size and appearance. They can be distinguished from the epicardial cells by their size, the presence of larger and smaller vacuoles, and the difference in their nuclei. They are fairly numerous. The epicardial cells are smaller, have no vacuoles, and have larger, rather oval vesicular nuclei.

In the hardened specimens no special changes are seen in the heart-muscles.

The kidneys show well-marked chronic passive congestion and slight chronic diffuse nephritis. The spleen is markedly congested.

PATHOLOGY. In considering the pathological anatomy of tropical abscess of the liver, we will deal first with that form associated with

previous or existing dysentery, and then with the so-called "idiopathic" liver-abscess. We shall leave out of consideration entirely the metastatic liver-abscesses following typhoid and tuberculous lesions of the intestinal tract, catarrhal and croupous dysentery, peritonitis, appendicitis, and perityphlitis, and pyelitis of the portal vein, suppurative endocarditis and the like. All these varieties are usually seen as multiple small abscesses, and are quite distinct in their etiology, size, situation, and anatomical appearances from the tropical abscess.

The form of dysentery followed by liver-abscess is peculiar, etiologically and anatomically. It is characterized by the formation of larger and smaller ulcers, usually deep, with irregular overhanging edges. In many places, in addition to the ulcerative process, larger and smaller abscesses exist in the submucosa under an apparently intact mucosa. In some places these communicate with the lumen of the intestine by small openings, through which puriform material can be squeezed. In some cases the muscularis is extensively invaded, and perforation may result. In the more severe cases there are long sloughs involving the mucosa, submucosa, and muscularis. Kartulis, Councilman and Laflaur, and Kruse and Pasquale, especially, have identified this alternative form of dysentery with the tropical dysentery and have established the etiological relation of the *amoeba coli* to it. These authors and others have found this organism invariably associated with the lesions in a way that leaves no doubt that it is the cause of the ulcerative process, which may be and usually is modified by the presence of various bacteria which mark the ulcers secondarily. The amoebae penetrate the mucosa and seek the submucosa. They may sometimes be found in the intestinal glands. The primary changes are in the submucosa. The mucosa is affected secondarily. Abscesses of varying size are found in the submucosa, and may burrow for considerable distances without breaking through the mucosa or invading the muscularis. Usually, however, both of these coats are finally involved in the process. Amoebae are present in large numbers in these abscesses and in the ulcers. The changes are usually limited to the colon, but not uncommonly the rectum, caecum, and even the ileum for a short distance are involved. The tissue-changes are chiefly those of necrosis and liquefaction. The amoebae are abundant in the lesions, and may be found for some distance away penetrating into the neighboring tissues.

The proportion of cases of this amoebic dysentery complicated with liver-abscess varies within rather wide limits in the experience of individual observers. The statistics collected by Councilman and Laflaur show that in India in 1429 autopsies on individuals dying of dysentery, liver-abscess occurred in 306, or one case of liver-abscess to every four and one-half cases of dysentery. In Algiers, of 1001 autopsies on dysentery cases 180 had liver-abscess, or a proportion of one liver-

abscess to five of dysentery. According to Kartulis, of 500 cases of dysentery, from 50 to 60 per cent. had liver-abscess. Of 40 American cases collected by us, 18 had liver-abscess. Liver-abscess may occur in the acute form of dysentery, but it is more common in the chronic variety, and then its course is often so insidious that clinical symptoms are lacking until the abscess is large or even ruptures.

By far the most common seat for these abscesses is in the right lobe of the liver. When the left is affected, it is usually in conjunction with the right. They are usually situated in the upper portion of the right lobe of the organ, just beneath the diaphragm. Next in frequency comes the lower portion of the right lobe, corresponding to the hepatic flexure of the colon. Kruse and Pasquale describe in one case an abscess in the lobus quadratus. The abscesses may start near the surface or deep in the hepatic tissue. They are more commonly single, but may be multiple; rarely, however, are there more than two or three. Occasionally they are small and numerous, widely distributed throughout the organ, and affecting both the right and the left lobes. In some cases several small abscesses may be grouped about a large one. Sometimes two or more abscesses may be connected by sinuses.

In size the abscesses vary from microscopic points to large collections of pus occupying as much as two-thirds or more of the liver-substance.

The abscess-contents consist usually of a reddish-brown, anchovy-sauce-like material, which is in some cases of an almost gelatinous consistency. In other cases the material is of a grayish-white appearance and contains larger and smaller masses of necrotic tissue.

The abscess-walls are usually ragged and show larger and smaller, irregular, soft, grayish masses of necrotic material. When the process is of recent date the abscess-wall is soft and the line of demarcation between it and the liver-tissue is irregular. In the older abscesses, beneath the soft necrotic material, there is usually a layer of rather translucent gelatinous-like material of varying thickness. Beneath this, and separating it from the surrounding liver-tissue, there is a zone of fibrous tissue which in old abscesses is dense and firm. This zone varies very much in thickness. In these abscesses the necrotic zone is often narrow and the fibrous tissue layer is thick. Always beneath the fibrous tissue zone the surrounding liver-tissue is compressed and indurated. Not infrequently scars of healed abscesses are found in the livers of individuals who have had dysentery, and die long afterward of some other affection.

Livers the seat of abscesses vary very much in size. Often the organ is not at all enlarged, and it may even be smaller than normal in cases of chronic abscess in the process of healing. Often the abscess or abscesses just fill the space of the degenerated and necrotic liver-tissue. In other cases the liver is enormously enlarged, usually in the case of

multiple abscesses. In chronic abscesses the size of the liver or of the affected lobe is often much decreased, due to the absorption of the purulent material, and the focal and diffuse cirrhosis that follows. The more fluid portion of the abscess-contents is composed almost entirely of granular detritus, and few well-preserved cellular elements are found. In recent abscesses degenerated granular and fatty liver-cells may be seen; in the pus from older abscesses these are usually absent. Rarely are polymorphous nuclear leucocytes found, and when present they are very few in number, and usually there is a bacterial mixed infection. Red blood-corpuscles are commonly seen, both well preserved and in various stages of degeneration. Careful search, which, however, in some cases must be repeated, practically always discloses amebæ. Often they are missed in aspirated pus, which probably usually comes from the central and older part of the abscess.

In even the smallest abscesses Councilman and Latleur found amebæ. According to their studies, the tissue-cells undergo necrosis and finally become liquefied, and this is probably associated with a serous exudation from the bloodvessels. There is a striking absence of nuclear fragmentation. In some cases they describe a necrosis of liver-cells in which the cells preserve their form, while in others they are broken up into highly refractive masses, and in still others they appear as fragments lying between the capillaries. These changes were noted in all of their cases, were not associated with the presence of amebæ, and were best marked in an acute case. These changes were met with always in the central portion of the lobule, and were often confined to a few cells near the central area. They showed no leucocytic invasion, and were not associated with the complete liquefaction of tissue and the formation of abscesses that occurred when amebæ were present. These authors attribute these diffusely scattered areas of necrosis of liver-cells to the action of soluble toxic substances produced by the amebæ in the intestinal lesions, and absorbed and then brought to the liver, while the necrosis and liquefaction of tissue in the abscess-areas are due to the direct action of the amebæ themselves.

They point out that these focal areas of necrosis may lead to cirrhosis of the parts of the liver affected, as sometimes occurs in India as a sequence of dysentery.

The small abscesses may be microscopical in size. They vary in shape, and their contents consist of firmly granular material with here and there cellular and nuclear fragments, and in some there is fibrin. Few, if any, leucocytes are seen, but red blood-corpuscles may be numerous. In the larger abscesses there may be more solid masses composed of liver-tissue that has escaped destruction. Often these masses represent portal systems, the interportal tissue having liquefied. Amebæ are always numerous in the smaller abscesses, being more numerous about

the periphery, extending in places into the liver-tissue, but not usually beyond the area of tissue-necrosis. A few may be found in the capillaries. The smaller abscesses do not exert any pressure upon the surrounding tissue. Abscesses of microscopic size may be found in every way connected with the larger abscesses.

In the larger and older abscesses generally three zones can be made out: an inner necrotic granular zone, then a highly refractive reticulum, and outside of this a layer of granulation-tissue of varying thickness. The appearances described in Case IV. are quite characteristic. The inner necrotic zone shows granular detritus, a few or more small round cells, few or many red blood-cells, and sometimes polymorphous nuclear leucocytes. Sometimes necrotic and fatty liver-cells are present. Usually in this zone amœbæ can be made out. They vary very much in number. Some sections may contain many, while in others few or none are seen. A striking thing in most cases is the absence of polymorphous nuclear leucocytes.

The granulation-tissue of the outer zone may be markedly cellular, but in the older abscesses the cells are few in number and those present are, for the most part, spindle-shaped.

Bile-ducts lined with cuboidal epithelial cells are numerous about and often in this layer. The bloodvessels are dilated, but often the walls of the capillaries are thickened. At the margin of the fibrous tissue zone the liver-tissue is compressed, and the liver-cells, being spindle-shaped, often lie in long, flattened rows. The connective tissue of the perivascular spaces is increased, many of the capillaries are obliterated, and the central areas have disappeared. The bile-ducts are numerous in some places and absent in others. There is a more or less well-marked cirrhosis of the liver-tissue, then, for a varying distance from the abscess.

There is a striking difference between the appearances, both in the acute and in the chronic amœbic abscesses, from those met with in abscesses due to bacterial invasions. In the amœbic abscess there is a striking absence of leucocytic reaction, and both the amœbæ and their toxic products evidently lack positive chemotactic properties for leucocytes, or even exert negative chemotaxis on these cells. In the amœbic abscess with bacterial mixed infections the difference in the number of leucocytes present is marked. In general, it can be said that pus with few or no leucocytes coming from a liver-abscess is of amœbic origin. If, however, there is a bacterial mixed infection, numbers of leucocytes may be present, the organisms causing the mixed infection being the cause of the leucocytic invasion.

Liver-abscesses may communicate with various organs and cavities. The most common secondary invasion is undoubtedly through the diaphragm into either the right pleural sac or directly into the lower lobe of the right lung.

If the communication here is due to a sudden rupture of a liver-abscess through the diaphragm, or, as may also occur, a rapid extension of the amœbic microbic process through this organ, the pleura rather than the lung is affected.

The opening of a liver-abscess into the lung, and the extension of the process into this organ, more commonly take place when the process gradually extends through the diaphragm and there is time for the occurrence of an adhesive inflammation between the visceral and diaphragmatic pleura. In the former case there is a sudden rupture through the diaphragm, with the evacuation of a large amount of pus into the pleural sac, with retraction of the lung. The pleura soon becomes thickened and covered with a ragged, easily broken-down necrotic material similar to that lining the liver-abscess. The retracted lung becomes firmly bound down by the thickened pleura, the thickness of which varies greatly. The pleural reaction in these cases usually protects the lung from invasion, and a pneumothorax rarely occurs. When the process from the liver-abscess invades the lower lobe of the right lung the resulting abscess shows very much the same appearances met with in the liver. The histological changes are, according to Councilman and Lafleur, much the same. The changes in the interstitial tissue are, however, more marked in the lung than in the liver, and there is usually a well-marked chronic interstitial pneumonia, the reaction being on the part of the interstitial tissue of the alveolar walls. The same degeneration and liquefaction of tissue are met with in the lung as in the liver. Abscess-formation is usually confined to the lower lobe, and the abscesses are usually single, but may be multiple. The lung-abscesses usually open into one or more bronchi, and the hepato-pulmonary abscess is thus drained. One of us has twice been able to make a diagnosis of unsuspected hepato-pulmonary abscess from an examination of the sputum; in both cases amœbæ were present in large numbers and were by far the most numerous cells in the sputum.

The lung is rarely, if ever, infected with amœbæ by the circulation. If amœbæ are carried from the liver by the hepatic vein—and it is difficult to see why this must not uncommonly happen—they certainly do no harm. Rarely, liver-abscess may rupture into the vena cava, and a large amount of pus may be carried to the lung, but death occurs before multiple abscess can form.

The pericardium may be invaded in two ways: (*a*) by the opening of a liver-abscess directly into the pericardium, and (*b*) by extension from either the pleural cavity or from a lung-abscess, either by rupture or by the gradual extension of the process through the pleura and pericardium, of which Case IV. is an example. A sinus may connect the two cavities. The character of the pus found in the pericardial cavity will depend upon the source of the pus: whether it is from the liver, the

pleura, or the lung; upon the length of time the pericardium has been affected; and upon the presence or absence of a bacterial mixed infection. In our case with mixed infection there was a marked inflammatory reaction, with the presence of a number of leucocytes in the pus. Amœbæ have not, so far as we have been able to learn, been described in the pericardium. In Case IV. they were found in the fresh pus, in the necrotic material covering the pericardium, and in the sections of the hardened tissues.

Hepatic abscesses may rupture into the gall-bladder and discharge their contents into the duodenum, or they may rarely rupture into the stomach.

Rupture into the abdominal cavity occurs but rarely. The right kidney may form a part of the wall of a liver-abscess and the pus may discharge in the urine.

Thierfelder collected 170 cases of liver-abscess, of which 76 opened into the lung and bronchi, 23 into the abdominal cavity, 32 into the intestine, and 13 into the stomach.

Aghetti collected 131 cases, of which 38 broke into the lung.

Three of our cases opened into the right pleural cavity. By far the most common place for rupture of hepatic abscess is into the thoracic cavity.

In four cases in which the heart-muscle has been examined (three cases by Flexner and our own case, IV.) fatty degeneration has been found. The changes in the kidney are limited to cloudy swelling and fatty degeneration, except in the rare cases where the right kidney forms a part of the wall of a liver-abscess. The spleen is usually enlarged, and is sometimes soft and sometimes firm, the latter usually being dependent upon a long-standing passive congestion. In one case of liver-abscess Krause and Pasquale found small pus-collections in the spleen distributed along the branches of the splenic veins. They think that this was brought about by the backward flow of pus which gained access to the portal vein.

Councilman and Lafleur failed to find the focal areas of necrosis in other organs than the liver. They were not present in our case.

The peritoneum may be invaded in several ways. In a few cases there is a peritonitis starting from the peritoneal coat of the intestine corresponding to the seat of the ulcers. The exudation is sometimes abundant, is of a peculiar gelatinous consistency, and contains large numbers of amœbæ. Bacteria may or may not penetrate the intestinal walls in these cases. If a liver-abscess ruptures into the peritoneal cavity, there is a widespread peritonitis with pus of the same character described above. Chronic fibrous peritonitis with thickening over the ulcers in the intestine is not uncommon. Chronic adhesive peritonitis about the liver, between the organ and the diaphragm, abdominal wall, omentum, and the transverse colon is common.

The macroscopical appearances of the so-called "idiopathic" liver-abscess are described as being similar to those of the chronic abscess associated with dysentery. They usually have firm fibrous walls.

So far as we can learn, there is no account of the histological lesions and no good description of the process. The histological study of the process in these cases promises much in clearing up their etiology.

(To be continued.)

HABITUAL OR RECURRENT DISLOCATION OF THE SHOULDER.

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AND

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HABITUAL or recurrent dislocation of the shoulder, although on the whole a surgical rarity, occurs often enough to have attracted to itself a certain amount of theoretical and practical consideration. The name "habitual dislocation" is intended to refer only to those cases where dislocation occurs from causes too slight to displace the normal joint. A person may dislocate one shoulder two or three times from a succession of severe accidents without falling into this special pathological class.

PATHOLOGY AND ETIOLOGY. The pathological condition present varies widely; certain abnormalities have, however, been demonstrated, chiefly in the head of the humerus, where it has been removed by excision for relief of the disability.

Cramer (*Berl. klin. Woch.*, 1882, p. 21) excised the head of the bone in an epileptic woman, thirty years old. The head of the humerus showed a depression in the posterior part of its articular surface. This was 4 cm. long, 2 cm. broad, and $\frac{3}{4}$ cm. deep. There was also found in the joint a loose body with a smooth surface, composed of bone, fibrous tissue, and cartilage, and this loose body was attached by a long pedicle to the back of the glenoid fossa. It seemed to be a piece broken out of the head of the humerus. Dislocation was apparently favored by this abnormality in the shape of the head of the bone.

Volkman (*Cent. für Chir.*, 1883, p. 28), quoted by Popke, resected the shoulder-joint in a man thirty years of age, an epileptic, whose shoulder slipped out with such ease that the arm was almost useless. The posterior third of the head showed a smooth surface not covered by cartilage, and the glenoid cavity was narrower below than above. The capsule was torn away from the glenoid cavity, and the joint, therefore, communicated with the bursa under the subscapularis muscle. A loose body was also found in this joint, evidently of bony origin, and apparently due to a fracture of the glenoid cavity.

Küster (*Beil. zum Cent. f. Chir.*, 1882, p. 73) excised the shoulder in a young man whose original dislocation was produced by the fall of a

heavy box on the shoulder. The head of the humerus showed a similar loss of substance, but no loose body was found in the joint.

In the discussion following the report of these cases Kraske reported a case operated on at Halle, where the changes in the head of the bone were similar to those mentioned above, and a loss of substance existed also in the glenoid cavity.

The cases of Cramer and Küster, at least, point plainly to a fracture of a part of the joint as a cause of the recurrent dislocations, and that such injuries may occur in simple dislocations of the shoulder is attested by at least three cases (quoted by Cramer):

1. Cooper: subspinous dislocation, subscapularis muscle torn off and attached to the glenoid fossa.
2. Hilton: subglenoid dislocation—greater tuberosity torn off.
3. Deuterlich: both tuberosities torn off and implanted lower down on the humerus.

Löbker (*Beil. zum Cent. f. Chir.*, 1886, p. 90) reported a case, the specimen being obtained post mortem, which seems to belong to another category, and with this goes a similar case resected by Vogt. In each case the anterior part of the head was normal. The posterior half, however, was flattened and showed a depression 1 cm. deep extending from top to bottom. This surface was covered by cartilage, and neither here nor in the glenoid cavity could any evidence of a previous fracture be found. The long tendon of the biceps had been torn from its insertion and was adherent in its groove, and the muscles had apparently been torn from the greater tuberosity.

It does not seem possible to attribute these malformations to fracture, as in the other cases.

Injuries to the muscles and tendons have been demonstrated by Joessel (*Deutsch. Zeitschr. f. Chir.*, 1880, xii, p. 167). He had the opportunity of examining post mortem the bodies of three patients (one with a double habitual dislocation), which furnished four specimens. Analysis of these showed in all cases that the supra- and infra-spinatus muscles had torn loose from the greater tuberosity and had retracted and wasted. By the retraction of the tendons of these muscles the capsule was drawn upon and pulled open so that it communicated with the subacromial bursa. The joint-cavity, therefore, was bounded above by the under surface of the acromion. In one the long tendon of the biceps was ruptured and was adherent to the groove. The cavity of the joint was much enlarged, having in one case a capacity of 90 c.cm., where it should have been only 28 c.cm.

In the two cases operated on by Ricard (*Bull. de l'Acad. de Méd.*, 1894, p. 330) the capsule was found to be thin, flaccid, and lax; no rent was found, nor was the joint-sac opened.

In the case operated on by Gerster (*Rules of Aseptic and Antiseptic Surgery*, p. 8, note 2), and in the two cases operated on by Burrell, no abnormality beyond laxity of the capsule was detected; but it must be

remembered that in these five cases the joint could not be so thoroughly explored and inspected as in the examination of a post-mortem specimen of a resected joint.

A consideration of this pathological evidence (Stimson : *Dislocations*, p. 265, quoting also Gurlt : *Path. Anat. der Gelenk-Krankheiten*, p. 250 ; Cushing : *Med.-Chir. Trans.*, 1837, p. 336) establishes the probability that in some cases, at least, the cause of the frequent dislocations may be

1. Laxity of the capsule of the joint.
2. Partial fracture of the head of the humerus.
3. Partial fracture of the glenoid cavity.
4. Tearing away of muscular insertions and rupture of tendons.
5. Abnormality in the shape of the head of the humerus not demonstrably due to fracture, but probably the result of chronic, non-suppurative inflammation.

It would seem as if in certain instances the cause of the recurrence of the dislocation was insufficient immobilization of the arm after a primary dislocation. The arm should be immobilized for at least ten days in order that the rent in the capsule of the joint may close.

SYMPTOMS AND DIAGNOSIS. Six cases are here presented for analysis, and of these, four have been carefully observed with regard to certain symptoms not heretofore recorded. The other two cases occurred earlier, and were not recorded in these especial symptoms.

In the four cases closely observed, three of the right arm and one of the left, the right shoulder has in all cases drooped.

Muscular Atrophy. Certain of the muscles of the affected side have been so notably atrophied and flabby that they have at once attracted attention on examination. The other muscles have not been notably smaller than those of the other side. The group of muscles affected in these cases has been uniform and constant.

The atrophied muscles are

Coraco-brachialis.

Triceps.

Deltoid, especially the posterior part.

Supra- and infra-spinatus.

Rhomboids.

Levator anguli scapulae.

Latissimus dorsi.

In a case observed by Lovett, where three dislocations of the right shoulder had occurred inside of a year, each from a sufficiently heavy fall, there was no marked atrophy of these muscles one week after the third accident.

Electrical examination in Cases III. and VI. showed no reaction of degeneration and no qualitative change except in the deltoid, which was more irritable on the affected side (Case VI.).

Limitation of motion was present in all cases to a slight extent, and this limitation was not due to pain nor to fear of displacement, but apparently to some lesion in the joint-mechanism. This was noticed chiefly when the arm was abducted by the patient to a right-angle with the body, and upward swinging of the forearm was attempted. Such rotation in this position was not so free as on the other side. In three of the cases abduction of the arm was limited.

Examination by the fluoroscope showed that the kathode rays penetrated the affected shoulder with more difficulty than the other, and at no time was the picture so clear. It could be seen that the head of the humerus was further from the acromion in the affected shoulder. It could be replaced and made to look like the other by raising the point of the elbow. (Cases IV. and VI.)

It should be noted that a large proportion of epileptics are found in all reported cases. Another point of interest is that, although reduction is, as a rule, easy, and inflammatory reaction in the joint is notably slight or even wholly absent after reduction, these patients have a constant and exaggerated dread of dislocation. The condition of "panic" when recurrent dislocation does occur seems to be an analogous mental condition to that of patients with hæmoptysis.

PROGNOSIS. In a shoulder-joint where a dislocation has once or twice occurred from insufficient cause it is not likely that the liability will become less frequent as time advances, if no treatment is undertaken. As a rule, the dislocations will occur with greater frequency and from slighter causes as time progresses.

TREATMENT. The methods of treatment may be classified under four heads:

1. By apparatus.
2. By massage and exercises alone.
3. By temporary fixation and massage.
4. By operation.

1. *Apparatus.* The use of apparatus confining the arm to the side is to be condemned. It weakens the muscles by causing their disuse. It is uncomfortable and partially disabling, and its use can only be considered justifiable temporarily or under exceptional conditions.

2. *Massage and exercises without apparatus.* This treatment is based on the advisability of improving the circulation and nutrition of the shoulder and strengthening the atrophied muscles. From the observations made as to the atrophy of the muscles surrounding the joint, and the relaxation of the capsule of the joint, it is clear that any improvement in the strength of these muscles is logically called for. The shoulder is allowed perfect freedom during this treatment. Case II., treated in this way three times a week for some months, improved in outward appearance, and the muscles, although not regaining their full tone as con-

trusted with those of the other side, grew much firmer. Dislocations, however, occurred as frequently as before this treatment was undertaken.

Case III., on the other hand, treated for six months by the same method, has had no dislocation, having gone longer than his usual period, and the muscles of the shoulder have improved in appearance.

Exercises should be made against resistance, and should be directed to the development by special training of the atrophied muscles. Examples of such exercises would be abduction of the affected arm to contract the deltoid, backward movements from the shoulder, forcible extension of the arm for the triceps, and similar movements.

3. *Fixation in connection with massage and exercises.* Prolonged fixation is called for when a second dislocation has occurred from slight cause. The arm is lifted by applying a sling, which supports the forearm and point of the elbow. The arm is held to the side by a swathe, thus preventing all motions of the joint. This removes as much weight as possible from the joint-capsule.

In connection with this treatment daily massage to the shoulder-muscles should be employed, and especially to the muscles found atrophied in such cases. After some weeks of fixation motion should be progressively allowed along with massage and exercises for the muscles ordinarily affected in these cases. This treatment should continue at least three months. Electricity is of help also in causing special contractions of the atrophied muscles. The faradic current of medium strength should be used.

4. *Operation.* The operative measures advocated have been few. The earliest method advised was to cause an extensive scar in the axilla, thereby binding the arm to the side.

Malgaigne (*Traité des Fractures et Luxations*, vol. ii.) advocated subcutaneous incision of the capsule of the joint by a tenotome introduced anteriorly, in the hope of producing inflammatory contraction.

Removal of the head of the humerus has been done several times, with surprisingly good results as to the restoration of motion and in the matter of usefulness of the arm. Excisions for the relief of this condition are recorded¹ by Cramer, Löbker, Küster, Volkmann, Kraske, and Vogt.

Excision of the head of the humerus is a mutilating operation, and will rarely be necessary. It is conceivable that after an exploration of the joint abnormalities might be found which would demand an excision.

Cramer is recorded as referring to an open incision of the joint as a possible operation in this condition in 1882 (*Berl. klin. Woch.*, p. 21).

Gerster (*Rules of Aseptic and Antiseptic Surgery*, p. 8, note 2) in 1883

¹ *Cent. f. Chir.*, 1883, p. 28; *Beilag. z. Cent. f. Chir.*, 1882, p. 73, and 1886, p. 90; *Deutsch. Zeits. für Chir.*, 1880, xiii, p. 167; *Pitha and Billroth*, ii, p. 652.

operated upon a recurrent dislocation where the weight of the arm alone was sufficient to displace the joint :

“The joint was freely opened by an anterior longitudinal incision, when it became evident that the tendency to dislocation was due to laxity or redundancy of the anterior part of the capsular ligament. By two semi-elliptical incisions a piece of the capsule one inch long and half an inch in width was removed. The capsular wall as well as the muscular and the skin-wound was united by three tiers of interrupted catgut sutures.” Suppuration occurred from improperly kept catgut; the wound was reopened and packed with gauze. No further complication interrupted the course of healing. The habitual luxation was also cured.

In 1892 Ricard (*Bull. de l'Acad. de Méd.*, 1894, p. 334) exposed the capsule of the shoulder-joint by dissection, in the case of a young man, twenty-seven years old, the subject of frequent dislocations of the left shoulder. He did not open the joint-sac, but reefed it anteriorly by stitches passed through its whole thickness about 2 cm. apart. Absolutely normal mobility was secured, and eighteen months later no recurrence of the dislocation had occurred.

A second case was operated on by Ricard a few months later in 1892. The patient was an epileptic, and had had some twenty-eight dislocations. The same operation was performed; restoration of joint-motion resulted, and a year after operation the shoulder had not again been dislocated.

On February 19, 1895, Burrell, through an anterior incision, opened the joint, explored it, removed an elliptical piece of the capsule, and sutured the capsule, thereby shortening it. The history of this case is appended in Case V.

He operated upon a second case February 16, 1897. The history is appended in Case VI.

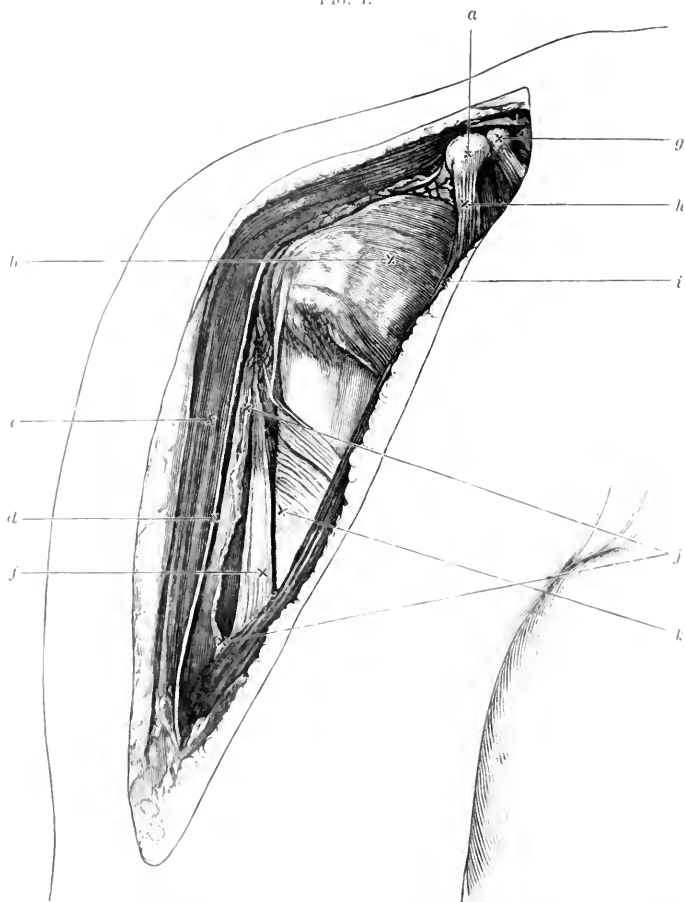
Fig. 1, which shows the field of operation, is a drawing from a dissection kindly made to demonstrate this operation by Dr. F. B. Lund. The important detail which is shown in the cut is the divided tendon of insertion of the pectoralis major. This allows the retraction inward of this muscle, uncovering the capsule of the joint. In order to gain access to the joint the subscapularis muscle should be partially divided. Then with hooked retractors a piece of the capsule can be excised.

The following description gives in detail the operation :

The patient was etherized and the arm slightly abducted. An incision was made from the coracoid process downward and outward, following the line of the cephalic vein to below the upper border of the tendon of insertion of the pectoralis major. The cephalic vein was then recognized, drawn outward, and the intermuscular septum between the deltoid and the pectoralis major was separated with the handle of the scalpel and by a few touches of the blade.

This exposed in the upper part of the wound the coraco-brachialis and short head of the biceps, and in the lower angle of the wound the upper part of the insertion of the pectoralis major.

FIG. 1.



a, coracoid process; *b*, subscapularis muscle covering capsule; *c*, deltoid; *d*, cephalic vein; *f*, long head of biceps; *g*, pectoralis minor; *h*, tendon of coraco-brachialis; *i*, pectoralis major; *j*, edge of divided tendon of insertion of pectoralis major; *k*, tendon of latissimus dorsi.

The acromio-thoracic artery was identified; the upper three-quarters of the insertion of the pectoralis major was divided in order to allow the muscle to be retracted inward and thoroughly to expose the head and neck of the bone. These now came into view, and in front of the head and neck of the bone could be seen and felt, through its sheath, the long head of the biceps.

It was found necessary to clear the tendon of the coraco-brachialis

and short head of the biceps quite up to the coracoid process, and to carry the incision in its whole depth up to the coracoid process.

By externally rotating the arm and dropping it backward the insertion of the subscapularis muscle could be distinguished; its tendon was stretched over the head of the bone. A portion of this insertion was divided. The finger felt the head of the bone, the anterior two-thirds of which was very plainly exposed, and it tended to slip forward toward the coracoid process. The coracoid process could be plainly distinguished, and the capsular ligament was apparently lengthened.

The arm was then abducted to an angle of 45° , and the head of the bone pressed backward to prevent the head from coming up under the coracoid process. By these means the front of the capsule was relaxed. The loose part of the front of the capsule was grasped with three-pronged vulsellum forceps. Three sutures were inserted with a curved needle beneath this, and this fold of the capsule, three-quarters of an inch in length and three-eighths of an inch in width, was excised.

Two of the sutures were cut out at the time of removing the bit of capsule. The other suture was held and tied. Another suture was introduced into the capsule. After these sutures were tightened and tied it was found that the capsule was distinctly tighter and shorter.

The acromio-thoracic artery was divided, and was the only vessel requiring ligature. Sterile water was used for irrigation. Silkworm-gut sutures closed the whole length of the wound. No attempt was made to unite the partially divided insertions of the pectoralis major and of the subscapularis, as when the arm was brought to the side these structures came together without suturing. The wound was dried, an aseptic dressing applied, and the arm fixed to the side with the hand across the chest.

The important steps in the operation are: the free division of the tendinous insertion of the pectoralis major for three-fourths of its breadth, in order that the head of the bone and capsular ligament may be freely exposed by retracting the muscle; the division of a portion of the insertion of the subscapularis; raising the arm to a horizontal plane and pressing back the head of the bone, which relaxes the front of the capsule so that it can be grasped and a bit removed.

A clear differentiation should be made of the anatomical structures, and, with this accomplished, the operation is feasible. The use of a broad retractor, without sharp points, on the inner side of the wound to retract the coraco-brachialis and the vessels is of great importance.

The result of the operation in the first case (Case V.) is that a year and ten months after operation the patient, when seen, stated that there had been no recurrence of the dislocation; that he had been fishing on the Grand Banks during the summer of 1896, and that the motions of the joint were perfect. In the second case (Case VI.), at the end of two

months, the patient is using the arm freely and has had no recurrence of the dislocation.

The first operation took one and three-quarters hours. The second operation took thirty-five minutes. It is purely an anatomical operation, and each anatomical structure must be recognized as carefully as in the ligation of an artery. So far as one can generalize from these two operations it is simple, efficient, and curative.

CONCLUSIONS. The treatment of recurrent dislocations of the shoulder-joint should be by massage and exercise, combined with primary fixation. If this fails after ten weeks' trial, an operation is advisable. This operation should be the exposure of the anterior part of the capsule of the joint, its partial resection, and shortening by sutures.

HISTORIES OF CASES.

CASE I.—A man, aged thirty years, subject to epilepsy, was seen by Dr. Lovett in 1889. The dislocation was subcoracoid, and could not be reduced without ether. It recurred frequently, and was generally caused by epileptic paroxysms at night. The patient only remained under operation for a short time, during which time a bandage was applied, holding the arm to the side. The dislocation was apt to occur whenever the arm was raised from the side. The condition gradually grew worse, and the patient disappeared from observation, being very remiss about treatment.

CASE II.—The patient, a young, healthy, but nervous man, aged thirty-two years, of fair muscular development, was seen by Dr. Lovett October 3, 1896. He had originally dislocated his arm by a heavy fall, and had been treated by an eminent surgeon.

The arm had been kept at rest about ten days, and then he had been allowed the use of it. When seen he had dislocated the arm four times, the last two being upon slight provocation.

He was seen with the arm dislocated in the subcoracoid position; it could not be reduced without ether. The arm was fixed for two weeks, at the end of which time the patient became restive and was unwilling to continue fixation longer. He was warned of the consequences, and was allowed the use of the hand. A few months later he dislocated it in falling down-stairs, and this time he refused to have it done up more than a few days. He experienced little discomfort from the dislocation. He was given massage and electricity, but after a few weeks felt better, and discontinued all treatment. During the summer he went abroad, and dislocated it by a fall of moderate severity.

In the fall of 1896 dislocations became more frequent, and were more easily reduced. He was treated by massage, exercise, and faradic electricity. In spite of efficient massage, given every other day for several months the arm continued to be dislocated at short intervals and on very slight provocation when the arm was in a position of abduction. Fixation for some weeks with daily massage was advised, but declined, and no treatment was pursued.

CASE III. A well-built and well-developed man, aged twenty-three years, medical student, consulted Dr. Lovett November 19, 1896. Right arm had been dislocated previously at football; it was fixed for a few

days, and then motion allowed. The dislocation was subglenoid, and was reduced without ether. A little later dislocation was produced by football again, and was reduced without ether. At intervals of a few months dislocations were produced by such causes as reaching up, pitching hay, throwing a stone overhand, and the last dislocation occurred in February, 1896, reaching out over a horse. No dislocation has occurred for over a year, but the patient has carried his right hand in his pocket, and tries not to lift it above the level of his shoulder. At present he is being treated by massage three times a week. The muscular condition has improved and a wider usefulness of the arm has been obtained. Except for the continual and characteristic dread of another dislocation, the patient is but little bothered. The muscles show no change in an electrical examination, and the patient can now reach above his head.

FIG. 2.



FIG. 3.



Case IV.—Showing the atrophy of certain muscles of the left arm.

CASE IV.—Seen by Dr. Lovett February 23, 1897. A professional ball-player. Dislocated his left shoulder October, 1894, in playing foot-

ball, being kicked in the axilla. The dislocation was subcoracoid, and was reduced under ether. The arm was fixed for a few days; two weeks after he began using it, and used it as well as ever.

In April, 1896, he dislocated the arm again in swinging for a standing jump; the dislocation was reduced without ether. Fixation for ten days. The first of February, 1897, he fell on ice, again dislocating the arm—a subglenoid dislocation. He kept the arm quiet for ten days, and three weeks later the arm was still sore.

An x-ray examination showed that the head of the humerus was not as near the acromion as on the other side. It could be restored to place by pressing the arm upward. The capsule was obviously lax, and the humerus “dropped.”

The atrophy of the muscles was characteristic. The arm was at once fixed by a sling and swathe for six weeks. Daily massage was given along with faradic stimulation of the atrophied muscles. Then the use of the arm was gradually resumed, and vigorous exercises, both special and general, were given to restore mobility and usefulness. The muscles improved much in appearance and feeling, and by the middle of April he was able to fill his place as catcher of a baseball nine.

CASE V.—Was seen by Dr. Burrell. The patient was twenty-seven years of age, a fisherman by occupation, whose history was as follows:

In August, 1893, fell from a staging and struck on the elbow and shoulder-joint. The dislocation was reduced by a fellow-workman, and

FIG. 4.



Case V. Before operation, showing the apparent “dropping” of the left humerus.

the patient remained at his work that day. There was no subsequent treatment. There have been numerous recurrent dislocations ever since the accident. At first he used to reduce the dislocation himself and continue work, but of late the joint will not remain reduced for any length of time. Can reduce it more easily than at first. There is some pain in the shoulder.

The patient is well developed and nourished. There is a history of epilepsy. The head of the humerus can be felt apparently in its normal position. There is some atrophy of the deltoid muscle. The sulcus between the deltoid and pectoralis major is very marked, and there is some flattening of the posterior scapular muscles.

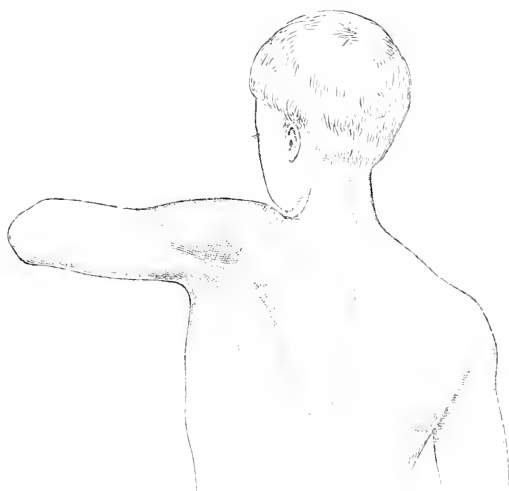
FIG. 5.



Case V.—After operation.

The patient requested that the arm be amputated, as it interfered so seriously with his work. The dislocation has taken place so frequently that he cannot remember the number of times it has occurred. Recently while turning in bed he has frequently dislocated the shoulder-joint.

FIG. 6.



Case V.—Showing atrophy of the left scapular muscles and latissimus dorsi.

On February 19, 1895, an incision was made over the deltoid muscle, beginning at its insertion and extending up about six inches. The fibres of the deltoid were separated, and three-fourths of the tendon of the

insertion of the pectoralis major was slit down to permit access to the joint. The capsule of the joint was found intact, but very loose. From the inner and anterior aspect of the capsule a piece was removed 4 cm. long and 1 cm. broad. This opened the joint. It was explored, and so far as could be felt was normal.

The capsule was closed by catgut sutures, and the wound was closed by silkworm-gut sutures. A sterile dressing was applied, the arm being put up with the forearm flexed and the point of the elbow raised and carried inward toward the median line.

There was considerable pain after the operation, but it was controlled by morphine. Aseptic healing occurred. The arm was dressed and all the sutures removed in twelve days, but the arm was restrained by a Velpeau bandage. Massage was carried out in this case for four weeks, and the patient returned to his full work at the end of eight weeks from the time of operation.

CASE VI.—Applied at Outpatient Department of the Boston City Hospital in February, 1896, and was operated upon by Dr. Burrell on February 16, 1897. Patient is a well-developed man of medium height, thirty-six years of age, a roofer by trade. During his life has given evidence of "petit mal."

FIG. 7.



Case VI.—Before operation; front view.

About a year ago, while learning to ride a bicycle he fell off and dislocated his shoulder. It was easily reduced and he continued his ride. Twenty minutes later he ran into a fence and dislocated his arm again. It was again reduced without ether, and was lame for some time, although no surgical treatment was adopted. Since that time he has dislocated the arm thirty-five times. It dislocates with the greatest readiness and from very slight causes. While under observation at the hospital he was asked to raise his hands to the level of his shoulder, which he did, and in lowering them the right humerus slipped and was dislocated into the subcoracoid position; it was easily reduced by the Kocher manipu-

lation. During the past two months he has found that on raising his arm above his head the shoulder would slip out of place. He usually reduces it himself.

FIG. 8.



Case VI.—Before operation, showing the atrophy of the scapular and other muscles of the right side.

FIG. 9.



Case VI.—After operation, showing the cicatrix.

His right shoulder droops. There is a moderate and characteristic atrophy of the muscles about the shoulder-joint. An x-ray examination showed that the tissues over the affected shoulder did not transmit the x-rays as easily as the other. A small amount of dropping of the head of the humerus could be seen. In this second operation a good deal of care was taken to record the various steps in order that it could be presented for publication; *vide* description of operation.

CHOREA IN THE AGED,

WITH THE REPORT OF A CASE OF THE DISEASE IN A MAN AGED SEVENTY-FIVE YEARS.¹

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COMPARED with its frequency in childhood, chorea is so rare in advanced life that the reporting of a new case seems not unwarranted.

The patient, Mr. C. W., a German, is seventy five years of age, married, and an upholsterer by trade. His father died of consumption; the mother and several brothers and sisters of unknown causes. None of his kindred were ever affected like himself, nor does there seem to have been any other neurosis in the family.

He was delicate in his youth and backward in growth, and was for these reasons excused from military service in Germany. He grew five inches in height after the age of twenty-one years. He has always been temperate in the use of tobacco and alcohol, and was seriously ill but once, when he was in hospital one month with some stomach-trouble. He never had rheumatism, but for a short time previous to the onset of his present illness he had pain in his left shoulder. He has always been very constipated, and thinks that he suffers from liver-trouble. For about twenty-five years he has had eczema of the left palm, which at present is worse than ever before. At one time the right hand was similarly affected, but recovered.

The onset of his illness was gradual. He first noticed, in September, 1895, that he could not readily pick up small objects, such as tacks, with the left hand on account of an unsteadiness of movement. The condition increased in intensity until the violent jerking of the left arm rendered all work impossible. The left leg also began to suffer, becoming unsteady and weak, but it has never presented the extreme inco-ordination affecting the arm. The movements are worse toward evening and after exertion or excitement. They cease entirely during sleep, but seem to delay the oncoming of sleep. The patient's eyesight is good, as is also his memory. There is occasional incontinence of urine, and frequent micturition at night (hypertrophy of the prostate gland). He believes the disease is due to exposure to draughts.

Status presentis. The patient is tall, lank, and pale, but on the whole well preserved for his age. There is well-marked *arcus senilis*; the pupils react to light and in accommodation, and are equal. The tongue is coated, deflected slightly to the left when protruded, but not tremulous. The radial arteries are thickened and tortuous; the veins of the forearms are unusually prominent and present a well-marked varicose condition. The left hand is the seat of a squamous and fissured eczema covering the entire palmar surface and extending also to the dorsum. On the back of the right wrist is a large purpuric patch, three by one and one-half inches, which appeared spontaneously. The most striking phenomenon presented by the patient is an inco-ordinate, grotesque,

¹ Read at a meeting of the Philadelphia Neurological Society, at which the patient was also shown.

tossing movement of the left arm, very wide in its range. The arm is thrown outward and forward and backward; at times it is quickly flexed at the elbow and brought against the trunk. Most frequent is a movement of backward adduction, so that the forearm comes to rest against the posterior part of the left iliac crest. The movements are so violent that they shake the patient's body and often hurl him forward for several feet. They are not constant, but at intervals cease for a few seconds. The left leg is also affected, but only in a slight degree. The gait is sprawling in character, but the left leg is not unduly lifted. That the limb is involved is best seen when the patient attempts to lie down—he then finds that the leg does not obey him, and that he cannot readily bring it up on the couch. After several attempts, in which the limb is tossed about, he suddenly lifts it up high and draws it with a jerk beside the other leg. Unless warned, he always lifts the limb up with his hand.

The will has no direct control over the choreic movements; voluntary motion, as a rule, intensifies them, but at times does not seem to do so. Thus when asked to lift a glass of water to his lips, he does it fairly well, but usually spills it just before drinking. The only way in which he can stop the movements after they have begun is to seize the left forearm with the right hand and hold it in front or behind the chest, the latter being more effectual. This manœuvre also increases the control over the left leg. Voluntary movements of the right arm aggravate the chorea. The grasp is good in the right hand, a trifle weak in the left, but more from interference with proper use than from actual paresis. He can, in fact, not take firm hold with the left hand, as the index-finger tends to remain in a position of over-extension. Speech is somewhat imperfect, but both the man and his wife attribute this to the loss of the teeth; at times, however, the tongue appears a little heavy to the patient. The knee-jerks are absent and cannot be elicited by Jendrassik's method of reinforcement. There is no true ataxia on standing with the eyes closed, although a certain amount of swaying occurs, which, I believe, is ascribable to the choreic movements. Tactile sensation is normal. The patient's mental condition is very good.

There is no notable wasting of the left arm, the difference in size—one and one-half centimetres—found on measuring, is probably due to the fact that the patient is right-handed, and the right arm therefore better developed.

Beyond some accentuation of the second aortic sound, the heart is normal. The temperature is 98° F.; the pulse is 84 in the sitting, 90 in the standing posture. The urine has a specific gravity of 1010, and is free from albumin; the quantity varies from three to five pints in the day.

Résumé. Left-sided hemichorea, involving arm and leg, in a man of seventy-five years; no real impairment of speech; no loss of memory or other psychic defect; movements not controlled by the will; knee-jerks absent; no history of rheumatism; no heart-lesion; duration of disease eight months.

Various types of chorea in adult and advanced life have been described. Herringham,¹ who has studied the different forms, divides them into the following groups:

1. One resembling chorea minor and lasting from a week or two to several months.

¹ Herringham: *Brain*, April, 1888, p. 134.

2. One due to a coarse subcortical lesion, which follows hemiplegia and sometimes precedes it.

3. The hereditary form of chorea, or Huntington's chorea.

4. An incurable form without hereditary basis and not due to subcortical lesion.

That Sydenham's chorea can occur in the aged has been fully demonstrated. Graves¹ noted it many years ago, and in his clinical lectures refers to two instances. It usually runs a course of from two weeks to several months, and terminates in recovery. Charcot² was inclined to consider all choreas of the senile period incurable. I have been able to find in literature thirteen cases ranging in age from forty to eighty-six years in which the disease terminated in recovery. The oldest case ending favorably was one reported by Sinkler—a man aged eighty-six years, who had left-sided hemichorea.

There is, as pointed out by Herringham, not the same tendency to cardiac complications as in juvenile chorea, nor is rheumatism as frequent in the anamnesis. However, in two out of the cases (Carline's and Sinkler's—Nos. 13 and 19 in the table) a heart-murmur existed. The movements are, as a rule, not violent, and the mind is generally not affected; but in the case of Ferrier (No. 17) there was mania, and hebétude in the case of Fry (No. 16). In the case of Macleod (No. 34) the patient was maniacal for one month, the duration of the chorea being five months. In other instances the chorea terminated fatally after a more or less brief period of time; at the autopsy the same paucity of lesions was presented as in the chorea of childhood. Grosse (No. 29) noted leptomeningitis. In a case of Charcot's (No. 39) the chorea began at the onset of a lobar pneumonia, from which the patient, a woman, aged sixty-nine years, died. The brain showed diffuse superficial encephalitis. The association of pneumonia and chorea has been observed in childhood. Osler found it in nine out of seventy-three fatal cases of chorea.

Of *Huntington's chorea* but little need be said in this place. The subject has been treated exhaustively by several writers within recent years. The essential features are the onset of choreiform movements in adult life, a progressive dementia, and the existence of the disease in the preceding generation. The affection rarely begins after the age of forty-five. In sixty-six cases tabulated by Huet,³ the onset was in two instances only after the sixtieth year, and only in ten after the fiftieth year. The movements in Huntington's chorea are very inco-ordinate and more rhythmical than those of Sydenham's chorea, and usually, particularly in the early stages of the disease, are under the control of

¹ Graves: Clinical Lectures. Reprint, 2d edition. Dublin, 1861. In closing his report of one of the cases, he remarks: "Thus do diseases of the nervous system affect a second childhood."

² Charcot: Medical Times and Gazette, 1878, I, p. 245.

³ These de Paris, 1889.

the will, and are nearly always bilateral. Speech is almost invariably affected, and the hopping gait is quite characteristic.

Posthemiplegic chorea, first described by S. Weir Mitchell and soon after by Charcot, is characterized by choreiform movements of moderate severity, intensified by voluntary effort, and affects especially the distal parts of the extremities, chiefly the fingers and toes. The movements are slow and somewhat athetoid in nature. Hemiplegia is nearly always present, and in some cases is associated with hemianesthesia; according to Huet,¹ combined motor and sensory paralysis is the most frequent condition. The reflexes are exaggerated on the choreic side.

The lesion giving rise to posthemiplegic chorea is situated subcortically, usually in the neighborhood of (optic thalamus; or within the posterior limb of the internal capsule; exceptionally in the anterior limb. In rare instances, as in the cases recorded by Charcot, Sinkler,² Gingeot,³ and others, the chorea precedes the occurrence of hemiplegia.

There is finally a class of cases, Group 4 of Herringham, which differs from chorea minor in its incurability, and from Huntington's chorea in the absence of the hereditary bias, and in which no gross subcortical lesion exists. A comparatively large number of examples of this variety have been recorded. Whether they in reality belong to a different type and possess their own peculiar pathology may be doubted. Huet⁴ maintains that it is not possible to distinguish between chronic chorea with an hereditary basis and chronic chorea without this feature. This view is also taken by Osler.

We have then practically but three forms of chorea in advanced life:

1. *Posthemiplegic and prehemiplegic chorea.*

2. *Chorea minor.*

3. *Chronic progressive chorea.* In some of the cases of this type (a comparatively small number after the fiftieth year) there is a distinct history of heredity. The existence of an hereditary tendency seems to induce the development of the disease at an earlier period of adult life, and also predisposes to dementia and other forms of mental failure. In the absence of heredity the onset is late in life, and mental disease is not so apt to occur.

The essential pathological changes are, we may assume, the same in both. In the one type—the so-called Huntington's chorea—the molecular defect of the motor centres and tracts is inherited; in the other it is acquired, as it must originally have been in the individuals who founded the various choreic dynasties. The case here reported seems to belong to the third group—that of chronic progressive chorea.

¹ Huet: *Op. cit.*

² Sinkler: article on Choreiform Affections, in Dercum's *Nervous Diseases by American Authors*, p. 259.

³ Gingeot: *Gaz. hebdom. de méd.*, 1887, 2 S. xxiv, p. 129. Gingeot found nine cases in the literature.

⁴ Huet: *Op. cit.*

N	Sex	Age	Suffering from	Rheumatism.	Heart.	Parts affected.	Mental faculties.	Duration.	Termination.	Remarks.	Reporter.
1	F	80	None	.....	None.	.....	.....	5 weeks	Recovery.	.....	Roger, <i>Gaz. des Hôpitaux</i> , 1854, xxvii, 559. Quoted by Herrington, <i>Ferguson, Lancet</i> , 1885, li, 92.
2	F	74	Fatigue from nursing husband	.....	None.	Left side.	.....	11 wks.	Recovery.	.....	Graves, <i>Clin. Lectures</i> , Reprint of 2d ed., p. 406.
3	M.	70	.....	.....	.....	.....	Depression of spirits before each attack.	Many months.	Recovery.	Movements very severe.	Graves, <i>Clin. Lectures</i> , Reprint of 2d ed., p. 406.
4	F.	50	Grief over death of husband and children	.....	.....	.....	.....	3 years.	.....	Attacks variable; worse on changing of moon.	Graves, <i>Ibid.</i> , p. 406.
5	F.	75	Irritation of nerves and shock following extraction of tooth.	.....	None.	.....	.....	2 weeks.	Recovery.	.....	Gauthier, <i>Jour. de Med. et Chir. Prat.</i> , 1881, lii, 60. Quoted by Herrington.
6	M.	68	.....	.....	.....	Right arm and head.	.....	15 yrs.	Death.	Nothing abnormal in brain microscopically.	Herrington, <i>Brain</i> , 1888, p. 131.
7	F.	67	Exposure.	Attack at 24.	Endocarditis of mitral valve.	First, right foot, then the other extremities and the face.	Delusions of persecution.	1 yr. +	Death.	Gyrus small and flattened; left lateral ventricle dilated; choroidal cysts; adhesions of spinal pia and dura in cervical region; softening of left cerebellar hemisphere.	Litten, <i>Charité-Annalen</i> , 1886, vi, p. 265.
8	M.	59	.....	.....	.....	.....	.....	.....	.....	.....	Litten, <i>Ibid.</i>
9	F.	60	.....	.....	None.	Right arm and leg.	Normal.	.....	.....	.....	Rank, <i>Neural Centralblatt</i> , 1866, xlii, p. 438.
10	F.	62	Worry and excitement.	Attack at 45.	None.	Upper and lower extremities, tongue, and lips.	Normal.	9 years.	.....	Had an attack of chorea at 12.	Suckling, <i>Brit. Med. Journ.</i> , 1888, i, p. 907.
11	F.	53	Mental anxiety	None.	None.	Movements general, most marked in left arm and leg.	.....	4 years.	.....	Kneejerkers present; some paresis of left arm and leg. Possibly chorea in mother.	Suckling, <i>Birmingham Med. Rev.</i> , 1892, xxxi, p. 269.
12	F.	68	Overwork in a factory.	Attack 2 years before.	.....	.....	.....	6 mos.	Recovery.	Attack severe; non-febrile.	Alexander, <i>Quoted by Mackenzie, Brit. Med. Journ.</i> , Feb. 26, 1887.
13	F.	73	Nervous excitement due to drunkenness of husband	Several attacks; nodules present during attack of chorea.	Aortic systolic murmur.	.....	.....	4 wks.	Recovery.	Attack severe; non-febrile. Several attacks during last three years.	Mackenzie, <i>Brit. Med. Journ.</i> , Feb. 26, 1887.

No.	Sex	Age	Self-history	Rheumatism	Heart	Parts affected	Mental faculties	Duration	Termination	Remarks	Reporter
27	F.	77		None	None	Left side chiefly.	Normal.	.....	Recovery.	Attack severe; treatment, zinc sulphate.	Russell, <i>Med. Times and Gaz.</i> , April 27, 1878.
28	M.	71		.....	Recurrent initial chorea; embolic affections.	Movements at first general, then limited to left side.	.....	3 mos.	Death.	Diffuse chronic leptomeningitis of base and convexity; oedema and hyperaemia of membranes; oedema of brain. Attack of chorea six to eight years before.	Groose, <i>Berliner klin. Woch.</i> , 1889, XXVI, pp. 739, 758.
29	M.	71		.....	Recurrent initial embolic affections.	.....	.....	.....	Death.	Diffuse leptomeningitis of base and convexity; hyperaemia of brain, attack eight years before.	Koch, <i>Deutsch. Arch. f. klin. Med.</i> , 1887, XI, 3, p. 341.
31	M.	72		.....	None.	.....	Good.	12 yrs.	Chronic.	Epilepsy since fifty.	Holmann, <i>Virch. Arch.</i> , 1888, CXI, p. 332.
32	M.	71	Severe fright.	No rheumatism; several attacks of intermittent fever in childhood.	None.	All four extremities; head, eyelids tongue; speech slow.	Nearly normal.	1 year.	Chronic.	Kneejerks normal.	Huet, <i>Thèse de Paris</i> , p. 91.
33	M.	78	Grief on account of infidelity of wife.	Attack at 38.	None.	First, right hand, then left hand, face and lower limbs.	Memory impaired.	6 years.	.....	Epilepsy at forty, ceasing after five years; kneejerks exaggerated.	Huet, <i>Ibid.</i> , p. 101.
34	M.	72	No cause; onset gradual.	None.	None.	First, head, then lower limbs, and then upper.	Good.	13 yrs.	Chronic.	Movements violent; kneejerks exaggerated.	Huet, <i>Ibid.</i> , p. 123.
35	F.	71	No cause.	None.	.....	Right side.	Dementia.	2 years.	.....	Epilepsy during first eighteen months of existence of chorea.	Huet, <i>Ibid.</i> , p. 140.
36	M.	61		No rheumatism; intermittent fever in childhood for 1 year.	None.	Movements general, involving face, head, trunk, and extremities.	Memory feeble; intelligence good; ideas of suicide.	Many years.	Chronic.	.....	Huet, <i>Ibid.</i> , p. 176.
37	F.	74		.....	.....	Upper extremities, face, head trunk; less degree lower limbs.	Profound dementia.	8-10 yrs.	.....	.....	Huet, <i>Ibid.</i> , p. 181.
38	F.	61		.....	.....	.....	Mania.	4 years.	Death.	Chronic arachnitis; atrophy of brain; excess of fluid in ventricles.	Bacon, <i>Journ. Ment. Sci.</i> , 1880, XXVI, p. 236.
39	F.	69	Chorea developed at onset of pneumonia.	.....	None.	Hands.	Much impaired.	Few days.	Death.	Oedema of brain; membranes injected and adherent to anterior and middle lobes, which were red—a diffuse superficial encephalitis.	Quoted by Huet, <i>op. cit.</i> , p. 229.

40	F.	66	Gradual onset.	None.	.....	Head, face, lips, tongue, trunk; limbs less affected.	Dementia.	15 yrs.	Chronic.	Knee-jerks exaggerated.	Lenoir. Thèse de Lyon, 1888. Quoted by Huet, <i>ibid.</i> , p. 256.
41	M.	55	.....	.....	None.	Trunk, limbs, face, tongue, muscles of speech; weakness of lower limbs, especially right.	Impaired.	6 years.	Death.	Pachymeningitis and hematoma of dura on both sides; pia congested and adherent; vessels atheromatous; atrophy of convolutions, especially superior parietal lobe; gray matter diminished; ependyma granular; cord soft.	Macleod. <i>Journ. of Ment. Sci.</i> , July 4, 1881, p. 194.
42	M.	43	.....	None.	.....	Movements generalized; head also affected.	Diminution of memory.	1 year.	.....	.....	Berdinel. <i>Gaz. Méd. de Paris</i> , 1878, p. 336. Quoted by Huet, <i>op. cit.</i> , p. 257.
43	M.	46	None.	None.	None.	All extremities, but chiefly the arms; speech affected.	Impaired.	3 years.	.....	Several previous attacks.	Berdinel, <i>ibid.</i> Quoted by Huet, <i>ibid.</i> , p. 258.
44	M.	41	Violent emotion from witnessing killing of a lieutenant.	None.	.....	Right side.	Normal.	6 years.	Chronic.	Onset sudden.	Revilbont. <i>Gaz. des Hôp.</i> , 1877, p. 801.
45	M.	56	Onset gradual; rapid intensification after death of wife.	None.	None.	Arms, head, and face; to less extent trunk and lower limbs.	Excitable but not demented.	15 yrs.	Chronic.	Knee-jerks exaggerated.	McLearn. <i>Lancet</i> , 1885, i, p. 337.
46	M.	46	.....	.....	.....	Head and arms; speech also affected.	Memory impaired, otherwise normal.	.....	.....	Chancere in earlier life.	Mirro. <i>Riforma Med.</i> , 1891, vii, 3, p. 289.
47	M.	50	.....	No acute attack.	Aortic valve disease.	Left side, especially arms.	Normal.	.....	.....	Movements to some extent controlled by will.	Saundby. <i>Lancet</i> , 1881, ii, p. 948.
48	M.	87	Exposure to wet.	No acute attack; some enlargement of joints.	None.	Chiefly arms; to less extent head and lower limbs.	No dementia.	5 weeks.	.....	.....	Saundby. <i>Ibid.</i>
49	F.	64	.....	.....	.....	.....	.....	24 yrs.	.....	.....	Bourneville. <i>Le Progrès Méd.</i> , Aug. 1, 1874, p. 458.
50	M.	68	.....	None.	.....	Arms and head, hips, trunk; lower limbs to less extent.	Good.	18 mos.	.....	.....	Russell. <i>Med. Times and Gaz.</i> , 1878, ii, 627.
51	F.	71	.....	.....	.....	.....	Dementia.	12 yrs.	Chronic.	.....	Charcot. <i>Med. Times and Gaz.</i> , 1878, i, 245.
52	F.	71	.....	.....	.....	.....	Dementia.	11 yrs.	Chronic.	.....	Charcot. <i>Ibid.</i>
53	M.	40	Rheumatism.	Rheumatic fever at 12 and 40.	.....	.....	.....	.....	.....	A previous attack.	Gowers. Quoted by Macleod.
54	F.	49	Blow on back and top of head.	None.	.....	.....	Mania 1 month.	5 mos.	Recovery. Recovery.	Attack serious; non-febrile.	Macleod. Quoted by Mackenzie.

No.	Sex	Age	Occasion	Rheumatism	Heart	Parts affected	Mental faculties	Duration	Termination	Remarks	Reporter
60	F.	80	Fall in heart 4 years before	.....	Haemic murmur at apex	Movements general; limbs, face, head, eye, tongue, right arm and leg were affected; speech affected.	Normal.	3 mos.	Death.	Knee-jerk increased on right side, normal on left side. <i>Autopsy</i> : ulcer of clivus; Blumenthal's; cerebrosclerosis of spleno-occipital bone; compression of tons; atheroma.	Muellerhoff, Berl. Arch. f. klin. Med., 1880, XXVI, 667.
61	F.	80	.....	.....	Heart decrepit.	Movements general; speech affected.	Impaired.	.....	.....	.....	Lloyd. Internat. Med. Mag., 1882, i, p. 363.
62	M.	70	Intemperate; fall in heart 20 years before	.....	.....	Movements general; sized; tongue and speech affected.	Mania from intemperance.	6 years.	.....	Had a fit, chorea appearing next day; subsided for a few days, then returned and became violent. Death from acute bronchitis. <i>Autopsy</i> : dura thickened, with deposits of lymph on surface, especially base; oedema of meninges; brain pale, sulci deep; atheroma; fluid in auricles.	Hale, Pathol. Trans., London, v, p. 16.
63	F.	59	.....	Rheumatism.	None.	.....	Insanity, 5 years.	5 years.	.....	.....	Miller. Amer. Journ. Med. Sci., 1890, XXX, p. 329.
64	F.	70	.....	None.	None.	.....	Impaired.	3½ yrs.	.....	.....	Miller, Ibid.
65	F.	72	.....	.....	Yes.	.....	Insanity, 3 years.	15 yrs.	.....	.....	Miller, Ibid.
66	F.	72	.....	.....	None.	.....	Chronic mania.	10 yrs.	.....	Movements lessened since entrance into hospital.	Miller, Ibid.
67	M.	55	.....	Yes.	None.	.....	Chronic melancholia, 5 years.	More than 5 years.	.....	.....	Miller, Ibid.
68	F.	56	.....	Yes.	None.	.....	Chronic melancholia, 5 years.	More than 5 years.	.....	.....	Miller, Ibid.
69	M.	46	.....	None.	None.	Limbs, head, and tongue.	Normal.	6 years.	.....	Improvement under treatment.	Macfaren. Journ. Ment. Sci., xx, p. 37.
70	F.	41	Severe fright at sight of murderer.	.....	None; heart irregular.	All voluntary muscles, including those of deglutition.	Weak-minded.	7 years.	Death.	Localized meningitis of membranes in longitudinal fissure, some oedema at base; atrophy of brain; dilatation of vessels, thickening, and amyloid bodies in lymph-sheaths; pigmentary degeneration of many cortical cells; loss of processes, changes in nuclei of 6, 7, 8, 9, 10, 11, 12 nerves; vascular changes in cervical cord; necrobiosis; partial sclerosis of antero-lateral column; inflammatory changes in nerves of brain and cord.	Berkley. Med. News, 1883, XLIII, p. 200.
71	M.	75	Exposure to draught.	None.	None.	Left leg and arm; speech not affected.	Normal.	8 mos.	.....	Attack severe; non-febrile; knee-jerks absent.	Personal observation.

I have collected in the appended table the cases of chorea coming on in adult life (after the thirty-fourth year) reported in the accessible literature, but have not included the cases due to gross subcortical lesions. The cases in which a distinct hereditary feature existed have also been omitted, since they have been exhaustively studied from the statistical standpoint by Sinkler, Huet, and others.

The total number of cases tabulated is sixty-five, including the one here reported. Of these, thirty-one (47.7 per cent.) occurred in men, and thirty-four (52.3 per cent.) in women. This proportion is interesting. It differs strikingly from that which obtains in juvenile chorea, as also from that given by other writers on chorea in adults, and corresponds very closely with the incidence of the hereditary form, or Huntington's chorea, in the two sexes. The latter, namely, affects both in nearly equal ratio. The oldest case reported was eighty-seven, the youngest, included in the table, thirty-four years at the inauguration of the disease. Tabulated by decades, the figures are as follows:

Age.	Cases.	Age.	Cases.
30 (34) to 40 . . .	6	60 to 70 . . .	9
40 to 50 . . .	17	70 to 80 . . .	8
50 to 60 . . .	19	80 to 90 . . .	6

From this table it is seen that forty-two (64.6 per cent.) began after the fiftieth year, while of the 66 cases of the hereditary form collected by Huet only 10 had passed that age.

In thirteen out of the sixty-five (20 per cent.) a history of *rheumatism* is given, or articular lesions of a rheumatic nature are described. *Endocarditis* was present in eight cases, or in 12.3 per cent.

In thirteen out of the sixty-five cases (20 per cent.) the chorea was *unilateral*, seven being left-sided and six right-sided hemichorea; but it will be noted that in a number of cases no description of the parts affected is given.

Mental impairment existed in twenty-seven instances (41 per cent.). If the series of five cases reported by Diller from various insane asylums be excluded, the proportion falls to 36.67 per cent. This is in striking contrast with the almost invariable existence of psychic degeneration in the hereditary forms of chorea. *Recovery*, as already stated, occurred in thirteen cases, or in 20 per cent.

The supposed *exciting cause* of the chorea was, in a number of instances, grief or sudden nervous shock; in Gauthier's patient the chorea followed immediately upon the extraction of a tooth. In the case here reported exposure to cold draughts is given as the cause.

CONCLUSIONS. 1. True Sydenham's chorea may occur in advanced life and may run a short course, terminating in recovery.

2. The majority of cases of chorea occurring late in life run a chronic and progressive course.

3. At the commencement of the disease it is, as a rule, impossible to say whether it will terminate favorably or become chronic.

4. The movements are generally most marked in the arms; they may begin in the lower extremities and, rarely, may remain confined thereto. In 20 per cent. of the cases in the table they were unilateral.

5. The mind is normal in three-fifths of the cases in which no hereditary element exists.

6. Rheumatism holds a very subordinate relation to the chorea of late adult life.

7. Endocarditis is comparatively rare, having occurred in only 12.3 per cent. of the cases collected in the table.

8. The anatomic lesions in the fatal cases are not characteristic.

DISINFECTION BY STEAM.

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THE rapid strides made in bacteriological work during the past ten years have given a stimulus, both in this country and abroad, to the study of disinfection and disinfectants. This has resulted in the accumulation of satisfactory and reliable data, which for the first time place this subject upon a scientific basis. The uncertainty which formerly existed regarding the value of various disinfectants and the manner of their application frequently brought sanitary methods into ridicule. This cannot be wondered at when we examine the long list of disinfectants which have from time to time been confidently recommended, and which we now know to be practically useless as germicidal agents. Fortunately, modern scientific investigation is gradually separating the valuable from the worthless disinfectants. We cannot justly criticise the former conclusions of the sanitarian, as his deductions regarding the value of disinfectants depended almost entirely upon the apparent success which followed their use during the prevalence of infectious diseases. The rapid subsidence of an outbreak was very apt to be attributed in a great measure to the use of certain disinfectants, and an undeserved reputation was frequently given to a worthless article. Today, with a fuller knowledge of the micro-organisms causing the different infectious diseases and the means of studying the effect of different agents upon them, we are enabled to decide with comparative accuracy as to the germicidal power of the latter. Although the experimental stage in the study of this subject may be said to be well advanced, yet the opportunities offered for further investigation in this direction are still great.

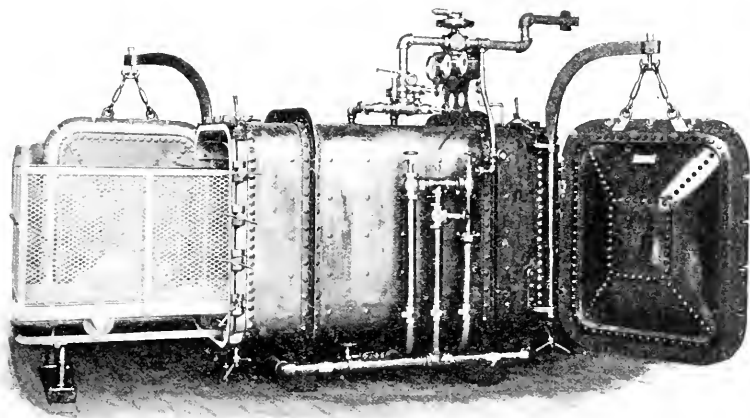
A substance which in the laboratory is germicidal to different micro-organisms with which it is brought in *direct* contact is not always an agent which can be depended upon in practical work. In the latter case the germs are usually not exposed, but are hidden in clothing, bedding, etc. Therefore the penetrating power of a disinfectant constitutes an exceedingly important consideration. Rapidity of action is also an important requisite, particularly in quarantine-work, as is likewise freedom from injurious effects upon delicate fabrics.

Appreciating the necessity of definite and reliable knowledge to guide us in practical work, I have conducted during the past year a series of experiments with some of the disinfectants now in use, and present in this article the results of the work as far as they concern steam.

There can be no diversity of opinion as to the superiority for many purposes of steam over all other disinfectants. The certainty of its germicidal effect, the rapidity of action, and its high penetrating power under proper conditions give it the highest rank. Unfortunately the cost of the apparatus necessary for its proper application limits its use mainly to quarantine and other public service. Although potent when intelligently employed, steam is worthless when improperly applied.

I can, perhaps, give no better idea of the modern perfected steam-chamber than by describing the apparatus for disinfection by steam now in use on the disinfecting-steamer "James W. Wadsworth," at the New York Quarantine Station. (Fig. 1.) This apparatus consists of

FIG. 1.



a rectangular-shaped chamber having a double shell with a space of 2 inches between its walls. The inside dimensions of the chamber are 39 x 48 inches by 7 feet 2 inches long. The shells are made of $\frac{5}{16}$ inch

open-hearth flange steel, riveted at the ends to heavy cast-iron rings, the outer surfaces of which are indented and contain $1\frac{1}{2}$ -inch T-shaped rubber joints, for the purpose of making the doors steam-tight. The latter are of a convex type, are swung on cranes, and fastened to the chamber with turn buckles. A car for the reception of material to be disinfected easily traverses the chamber. It is made of $1\frac{1}{2}$ -inch angle-iron and No. 6 galvanized iron netting. A movable track is so arranged that the car can be entirely withdrawn from either end of the chamber. The steam is supplied from the boiler of the steamer, where a pressure of 65 pounds to the square inch is maintained. Both moist and dry steam outlets have been constructed, which, by a system of valves, allow the operator to get almost any quality of steam desired. The steam enters through a 2 $\frac{1}{2}$ -inch pipe to a reducing valve, which limits the pressure of the steam entering the chamber of the apparatus to the desired amount; at the present time it is set for 15 pounds to the square inch. The pressure used in the chamber is in accordance with the temperature required. If a temperature of 230° to 250° F. is desired, steam at about 10 pounds pressure is employed.

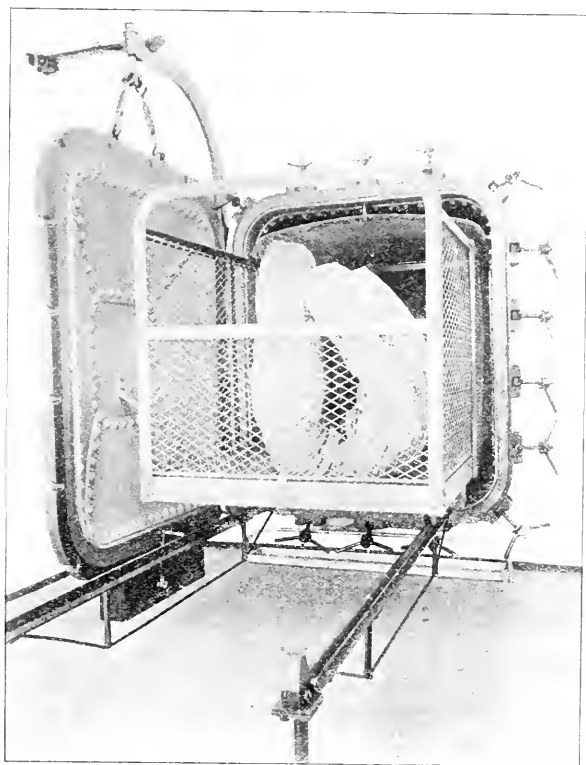
For obtaining a vacuum in the chamber a steam-exhauster is used. By means of valves this is readily changed to draw either from the space between the shells forming the walls, or from the interior of the chamber. It acts on the principle of a siphon: a current of steam rushing by the mouth of a pipe opening into the chamber exhausts the air therein contained.

A vacuum of $1\frac{1}{2}$ atmospheres (about 22 or 23 inches) can be obtained with the steam-exhauster in one minute, while in the old method, by the use of a vacuum-pump, about ten or fifteen minutes were necessary to secure this result; besides, the air removed from the chamber is carried out with the steam in the exhaust, so that if micro-organisms are withdrawn in this way from the materials in the chamber they are acted upon by the steam in transit. This does not occur where a vacuum-pump is used.

The advantages of the double jacket or shell over coils of steam pipes are numerous. There is a more equal diffusion of heat in the walls of the apparatus, inasmuch as the steam enters between the shells at all points and not at the lower part of the apparatus, as in the case where the steam is introduced by pipes laid in the floor of the chamber. The shell is thus evenly heated and materially aids the steam which is introduced in the chamber for disinfection. Leaks are frequently found where the pipe system is employed; these do not occur when the double shell is used; there is no formation of air-bound spaces in the double shell, which frequently interfere with securing the temperature needed; and, finally, in the matter of cleanliness, the double jacket is very superior to the coils of pipes.

The fresh-air inlet, which, as far as I am able to learn, was first used at this Station, and which has proved of great practical value, consists of a $1\frac{1}{2}$ -inch pipe connecting the interior of the chamber with the external air. It is fitted to the top of the apparatus. The external opening of the inlet is covered with a strainer of fine brass netting, to prevent the entrance of foreign matter. The inlet is supplied with a valve, to open and close it. The entire chamber is encased in a $1\frac{1}{2}$ -inch layer of asbestos magnesia, which retains the heat in the chamber and prevents

FIG. 2.



Infected end.

outside radiation. This it does in a very effective manner, the temperature of that portion of the boat in which the apparatus is placed being very little raised above that of adjoining apartments. The ends of the chamber open into rooms having absolutely no communication with each other, the infected end (Fig. 2) receiving the clothing removed from the disrobing-room adjoining. The disinfected end

(Fig. 3) opens into an apartment from which the clothing is given directly to the owners, who have passed through the bath-rooms. The operation of disinfecting clothing, bedding, etc., with the steam-chamber is as follows: the materials to be treated are placed in the cradle or car in the infected end, which is seen in Fig. 2 (both ends of the chamber are never open at the same time), the door is then bolted, and a vacuum of about 20 inches is obtained by the steam-exhauster. This is secured in about one minute. The object is not only to remove the air from the

FIG. 3.



Disinfected end.

chamber, but also the air and moisture from the material to be treated, which, forming a cushion, prevent the proper entrance of the steam. Steam is now allowed to enter the chamber, which it does very rapidly, producing a temperature of 230° to 240° F. within three or four minutes. My experience has been that 230° is the temperature that is needed for disinfection. This is unquestionably safe, and can be depended upon to kill all known micro-organisms which may be in clothing and other articles presented for treatment, provided there is an exposure of fifteen minutes to this degree of heat. At the expiration of this time — *i. e.*, after an exposure of fifteen minutes to a temperature of 230° —the steam exhauster is again used, securing the same degree of vacuum (20

inches). This now removes the steam from the chamber and from the texture of the clothing, etc., undergoing disinfection, the latter being a most important consideration, as will be shortly shown. After the vacuum of 20 inches has been obtained the fresh-air inlet is opened and a current of fresh air allowed to pass through the chamber and its contents. This, it must be understood, is in conjunction with the steam-exhauster, which is still kept at work. The entrance of the air, of course, breaks the vacuum, but the exhauster carries the air rapidly through the chamber. After an exposure of eight or ten minutes to this treatment the door in the disinfected end is opened, and the clothing, etc., after being unrolled and exposed for five or six minutes, becomes dry and can be at once worn.

The degree of improvement in the drying-process, which is the result of the combined action of the steam-exhauster and the fresh-air inlet, can only be appreciated by one who has waited two or three hours or more for this same result. When it involves the detention of a ship at a quarantine-station its value is at once apparent. The importance of the rapidity with which this work is now performed and the materials dried is especially appreciated in the treatment of mail. Letters and papers treated with steam by the slower or older process were frequently injured by the disfigurement of the address and the unsealing of the letters. During the past three months the British India mail has been disinfected weekly at this station. The few letters which are sealed with wax, and packages containing books or other materials injured by heat, are set apart for disinfection by other methods and the remainder subjected to the process indicated above. So far, I have yet to see a letter the superscription of which has been affected, and very rarely have I found a letter unsealed or partly unsealed. This satisfactory result, I am certain, is due to the rapidity of action of the heat, and the use of the exhauster and fresh-air inlet afterward, which rapidly dries and prevents the spreading of the ink and the unsealing of the package.

The still more important and valuable effect of the vacuum is shown in the rapid and pronounced penetration which it insures. It gives a higher degree of temperature inside the packages, with a comparatively short exposure.

The first series of tests presented for consideration show the influence of the vacuum in steam disinfection. In all the experiments which I have made I constantly used packages of paper, inasmuch as this material probably offers as much (if not more) opposition to penetration as any with which we have to deal. In the tests made without vacuum, although the steam-exhauster is not used, the outlet which leads from the bottom of the apparatus and which allows the escape of water, the result of condensation, is opened for a moment after the chamber is closed, to allow a certain amount of the air contained in

the chamber to be forced out by the incoming steam. This vent is imperative in carrying out the disinfection, as in an absolutely tight chamber the presence of all the confined air offers so much resistance that it is practically impossible to raise the temperature to the proper degree for disinfection. When the chamber is perfectly closed it frequently requires half an hour or more to get a temperature of 210° F.; whereas when the steam-exhauster is used 240° F. can be reached in three or four minutes, and where the air in the chamber is simply released by opening the conductor on the floor of the chamber above referred to, the same temperature (240° F.) is attained in about eight or ten minutes. This, however, does not answer the same purpose as the vacuum, which forcibly draws out the air contained in the chamber and its contents.

In the experiments about to be considered an accurately tested self-registering thermometer was placed in the centre of each package enumerated in the different experiments.

TABLE I.

Article.	Weight.	Subjected to degree of tempera- ture.	Time of exposure.	Thermometer in package registered	
				With vacuum.	Without vacuum.
	Lbs.	°	Min.	°	°
Newspaper	1	210	3	210	200
Newspaper	2	210	3	210	160
Newspaper	2	240	3	210	160
Newspaper	3	210	3	200	110
Newspaper	3	210	3	200	111
Newspaper	3	210	3	220	120
					(loosely wrapped)
1 cotton sheet	1	240	3	240	210
2 cotton sheets	2	210	3	239	237
1 double rose blanket	4	210	3	239	185
2 double rose blankets	8	210	3	203	110
1 ordinary house-rug	7	210	3	238	235
1 bag woollen clothing	7	240	3	173	108

TABLE II.

Article.	Weight.	Subjected to degree of tempera- ture.	Time of exposure.	Thermometer in package registered	
				With vacuum.	Without vacuum.
	Lbs.	°	Min.	°	°
Newspaper	1	231	10	230	218
Newspaper	2	231	10	212	200
Newspaper	3	231	10	190	170
2 double blankets	8	231	10	215	190
2 sheets	2	231	10	230	229
1 bag woollen clothing	7	231	10	230	232

TABLE III.

Article.	Weight.	Subjected to degree of temperature.	Time of exposure.	Thermometer inside package registered
With vacuum :	Lbs.	°	Min.	°
Newspaper	1	240	10	240
Newspaper	2	240	10	232
Newspaper	3	240	10	200
2 cotton sheets	2	240	10	240
2 double rose blankets	8	240	10	188
1 bag woollen clothing	7	240	10	236
Without vacuum :				
Newspaper	1	244	10	240
Newspaper	2	244	10	210
Newspaper	3	244	10	196
2 cotton sheets	2	244	10	235
2 double rose blankets	8	244	10	195
1 bag woollen clothing	7	244	10	205

TABLE IV.

Article.	Weight.	Subjected to degree of temperature.	Time of exposure.	Thermometer inside package registered
With vacuum :	Lbs.	°	Min.	°
Newspaper	2	230	10	215
Newspaper	2	230	10	195
Newspaper	3	230	10	170
Without vacuum :				
Newspaper	2	227	10	133
Newspaper	2	227	10	174
Newspaper	3	227	10	120

It will be seen that the effect of the vacuum in favoring penetration is more apparent in short exposures. Where the exposure is longer the difference in the temperature, as shown by the thermometers inside the packages, is not so great. This is shown in Table I. In this table it is shown that the temperature inside a package of paper weighing two pounds was 210° F. after an exposure of three minutes with vacuum; while the temperature inside a package of the same weight without vacuum was only 160° F., a difference of 50° F.; whereas in Table II., after an exposure of ten minutes the difference in temperature inside of a package of paper weighing two pounds, with and without a vacuum, was only 120° F. It will be noticed that the effect of the vacuum is more decided in the three-pound packages of paper, or in any material where the resistance to the penetration of steam or heat is pronounced. This is also shown in Tables I. and II., where the thermometers were wrapped in cotton sheets, which are very easily penetrated; the temperature was about the same with and without vacuum.

In Table I. a bag of woollen clothing showed a temperature inside the package of 172° F. with vacuum and 108° F., without vacuum; while

in Table II, the temperature inside the bag of clothing was practically the same with and without vacuum, and about equal to the temperature of the chamber. In Table III, there is a marked difference between the test with a bag of clothing made with and without vacuum. These discrepancies are easily explained in this particular case: the clothing was simply pushed into the bag after the manner of sailors, and after each test the clothing was removed and aired again and placed in the bag for the succeeding test, and was not packed with the same degree of tightness in each instance, nor could the thermometer always be protected to the same extent. However, the advantage of the vacuum is shown in two of the three tests. In Table IV., where the experiments were made with packages of newspapers, the advantage of the vacuum is again evident.

It was meant that the temperature of the chamber should be the same in each instance where the tests with and without vacuum were to be compared; but occasionally the steam-pressure becomes somewhat unruly, and a difference of a few degrees is noticeable, as in Tables III. and IV. In these cases it was necessary to divide the tables. However, a fair comparison can be made.

It is frequently observed that the temperatures registered in packages of the same material and weight and subjected to the same temperature in different tests do not always agree. Thus, a package of newspapers weighing two pounds and subjected to a temperature of 240° F. for ten minutes may show an inside temperature of 230° or 232° F., while the temperature in the same test at another time will show a difference of 10° or more. This is due to the way of folding the package, which cannot be performed in exactly the same manner in each instance. If the material is more tightly wrapped, the temperature inside is correspondingly less. This occurs where the greatest care is exercised.

The results detailed in the preceding tables also indicate the importance of a sufficient duration of exposure. In Table I, it is shown that the temperature within a package of newspapers weighing two pounds, and subjected to a temperature of 240° F. for three minutes, was 210° F. with vacuum, whereas after an exposure of ten minutes to the same temperature it was 232° F. In the above experiments the steam-pressure in the chamber necessary to secure the temperature required (about 230° F.) was from eight to twelve pounds to the square inch. In the tests made with a perfectly tight chamber, with no release of the confined air, it was practically impossible to obtain a sufficiently high degree of heat. Even a comparatively low temperature required from half to one hour. In one instance, with a pressure of fifteen pounds to the square inch, a temperature of 202° F. only was reached in forty-five minutes; whereas, as already shown with the steam-exhauster, a temperature of 240° F. was reached in three minutes. In another test,

without any vent in the chamber, 215° F. was reached in about the same length of time (less than an hour). I believe, therefore, it is unnecessary to consider further the process of disinfection as performed in a perfectly tight chamber.

In the investigation of steam disinfection it soon becomes apparent that as the degree of pressure in the chamber diminishes the penetration is correspondingly less. The following tables, V. and VI., will illustrate this. In these tests there was no steam-pressure in the chamber whatever, the indicator registering nothing. It will be seen by referring to Table I. that in the package containing two cotton sheets penetration was very easily effected, the thermometer inside the package being within four degrees of the temperature of the chamber (240° F.) after an exposure of only three minutes, while Table V. shows a difference of 48° F. between the temperature of the chamber (170° F.) and the temperature inside the package of sheets after an exposure of ten minutes. This marked difference is also seen in Table VI.

TABLE V.

Article.	Weight.	Subjected to degree of temperature.	Time of exposure.	Thermometer inside package registered
With vacuum :	Lbs.	°	Min.	°
Ordinary house-rug	7	170	10	100
Newspaper	1	170	10	137
Newspaper	2	170	10	120
Newspaper	3	170	10	107
2 double rose blankets	8	170	10	120
2 sheets	2	170	10	122

TABLE VI.

Article.	Weight.	Subjected to degree of temperature.	Time of exposure.	Thermometer inside package registered
Without vacuum :	Lbs.	°	Min.	°
1 rug	7	200	10	105
Newspaper	1	200	10	160
Newspaper	2	200	10	120
Newspaper	3	200	10	100
2 double rose blankets	8	200	10	135
2 sheets	2	200	10	165

The results given in the above tables have been repeatedly verified by numerous tests of the same character.

These preliminary tests were regarded as necessary to the proper investigation of the effects of steam under the given conditions on the bacillus of the bubonic plague and the diphtheria and anthrax bacilli, the results of which are given below. In order that there should be no question as to the vitality of the micro-organisms used, the cultures were

freshly prepared in each test by Dr. C. B. Fitzpatrick, who carefully maintained their virulence by inoculation of guinea-pigs and white mice. This procedure was carried on in connection with his work with the plague antitoxin, a report of which has recently been published in the *New York Medical Journal*. Sterilized linen disks soaked in bouillon cultures and enclosed in cotton, woollen, and paper envelopes, were placed inside the packages used in the different experiments.

It was found in all cases, where linen disks soaked in cultures of the bacilli of the above-mentioned diseases were placed in open Petri dishes and then laid on the floor of the cradle in the steam-chamber, and subjected to a temperature of 155° F. for fifteen minutes, that no growth occurred. I believe that it is safe to regard this temperature as causing the death of the bacilli in question in all cases under these conditions, although the germs were usually killed at a temperature of about 135° F. It is to be understood, however, that a temperature of 155° F. must reach the interior of the package. A chamber-temperature of this degree (155° F.) would probably show not more than 100° F. inside the package, and would be manifestly insufficient even with a long exposure. By referring to Tables V. and VI. it will be seen that in but two instances did the temperature inside the packages reach 155° F., and this occurred once in a package of one pound of newspaper and once in one composed of two sheets, where an exposure of ten minutes to a temperature of 200° F. was made. The packages were removed from the chamber in each experiment immediately after the exposure and the disks contained therein placed in tubes containing bouillon. The tubes were kept in the incubator for at least a week before a final decision as to the growth of the bacilli was made.

The facts secured in the first series of experiments (with thermometers) relative to penetration, etc., corroborate the tests made in the second series (with micro-organisms), and show that where the packages were subjected to low temperature growths frequently occurred; and although a lower temperature may cause the death of the micro-organisms subjected to it, it is unsafe to compute too closely the degree of heat necessary for germicidal action; therefore considerable margin should be allowed. For this reason I believe that a temperature of at least 155° F. must be secured inside the packages to be disinfected. The tests described above made with self-registering thermometers in the first series of experiments may be used as a guide. A study of the following tables shows that where packages containing infected disks were subjected to comparatively low temperature the results were variable. This is well shown in Tables VII. and VIII. (second series), where packages of the same material and weight were subjected to the same temperature and exposure (170° F. for ten minutes).

SECOND SERIES.

TABLE VII.—WITH VACUUM.

Temperature, 170° F. Time of exposure, 10 minutes.

Plague:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	Growth.
3. Newspaper, 2 pounds	Growth.
4. Blanket	No growth.

Diphtheria:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	No growth.
4. Blanket	No growth.

Anthrax:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	No growth.
4. Blanket	No growth.

TABLE VIII.—WITH VACUUM.

Temperature, 170° F. Time of exposure, 10 minutes.

Plague:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	Growth.
3. Newspaper, 2 pounds	Growth.
4. Blanket	Growth.

Diphtheria:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	Growth.
4. Blanket	No growth.

Anthrax:

1. Sheet of paper and envelope	No growth.
2. Newspaper, 1 pound	Growth.
3. Newspaper, 2 pounds	Growth.
4. Blanket	Growth.

Nothing can better illustrate the unreliability of a low temperature in steam-disinfection than the experiments shown in Tables VII. and VIII. The infected disks enclosed in paper and envelope show "no growth" in all the tests; beyond this there is no uniformity in the result, even where the disks were in a single newspaper. A reference to Tables V. and VI., where packages of similar material and weight

(as used in Tables VII. and VIII.), and containing self-registering thermometers, were subjected to the same temperature and exposure, will present a satisfactory explanation of the irregular results shown in Tables VII. and VIII. It will be seen in the experiments in Tables V. and VI. that an inside temperature of 155° F. (which may be regarded as the minimum necessary to insure destruction of the bacilli) was reached in only two instances, both in Table VI., and, as might be expected, in material which practically offered the least resistance. (See Table VI., one pound of newspaper and two sheets.)

TABLE IX.—WITH VACUUM.

Temperature, 200° F. Time of exposure, 10 minutes.

Plague:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Newspaper | No growth. |
| 3. Newspaper, 1 pound | Growth. |
| 4. Newspaper, 2 pounds | Growth. |
| 5. Blanket | No growth. |

Diphtheria:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Newspaper | No growth. |
| 3. Newspaper, 1 pound | No growth. |
| 4. Newspaper, 2 pounds | Growth. |
| 5. Blanket | No growth. |

Anthrax:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Newspaper | Growth. |
| 3. Newspaper, 1 pound | Growth. |
| 4. Newspaper, 2 pounds | Growth. |
| 5. Blanket | Growth. |

It is of great interest to note that in Table IX., where the temperature of the chamber in the test was increased to 200° F. (30° more than in the experiments recorded in Tables VII. and VIII.), that the germicidal action was more apparent. This is also shown in the following Tables, X., XI., and XII.

TABLE X.—WITH VACUUM.

Temperature, 200° F. Time of exposure, 15 minutes.

Diphtheria:

- | | |
|--|------------|
| 1. Blanket | No growth. |
| 2. Newspaper | No growth. |
| 3. Newspaper, 1 pound | Growth. |
| 4. Newspaper, 2 pounds | Growth. |
| 5. Magazine, 200 pages, disks in middle near binding | Growth. |

¹ Tube of bouillon containing infected disk broken

TABLE XI.—WITH VACUUM.

Temperature, 202° F. Time of exposure, 5 minutes.

Plague:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Newspaper, 1 pound | No growth. |
| 3. Newspaper, 2 pounds | Growth. |
| 4. Magazine, 160 pages, disks in middle near binding | No growth. |

TABLE XII.—WITH VACUUM.

Temperature, 202° F. Time of exposure, 10 minutes.

Plague:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Newspaper, 1 pound | No growth. |
| 3. Newspaper, 2 pounds | Growth. |
| 4. Magazine, 160 pages, disks in middle near binding | No growth. |
| 5. Blanket | Growth. |

In Table XI., with an exposure of five minutes to a temperature of 202° F., the disks placed in the rolled blanket showed no growth; while in Table XII., with an exposure of double the time (ten minutes), the disks in a similar package (blanket) show a growth. This undoubtedly is the result of a difference in the degree of tightness with which the blanket was wrapped, and is often noticed where the test-articles have been exposed to comparatively low temperature; whereas with higher temperature given with shorter exposure no way in which a blanket or other package is rolled can interfere sufficiently with the penetration to prevent germicidal action. This is well illustrated in the experiments which follow, showing tests made with higher temperature.

In the following table the temperature of the steam-chamber was raised to 215° F., an increase of about 10° over that used in the experiments cited in Tables X., XI., and XII. For the first time we find the bacilli killed in all the packages.

TABLE XIII.—WITH VACUUM.

Temperature, 215° F. Time of exposure, 10 minutes.

Plague:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Book, 600 pages | No growth. |
| 3. Newspaper, 1 pound | No growth. |
| 4. Newspaper, 2 pounds | No growth. |
| 5. Blanket | No growth. |

Diphtheria:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Book, 600 pages | No growth. |
| 3. Newspaper, 1 pound | No growth. |
| 4. Newspaper, 2 pounds | No growth. |
| 5. Blanket | No growth. |

The anthrax-tests in this group of experiments are omitted, as unfortunately the labels of some of them were partially obliterated and made uncertain.

The following Tables, XIV., XV., XVI., XVII., XVIII., and XIX., are severe tests, inasmuch as they include packages of paper weighing three pounds. I do not believe that any material or bundle which might be presented for disinfection would be able to resist the penetration of steam to such an extent as some of the packages enumerated in the following tables, and I am firmly convinced from the experimental work and results gained in the foregoing experiments that a temperature of 230° F. in a steam-chamber, with an exposure of fifteen minutes, and the use of a vacuum will kill whatever vegetative organisms (and also probably spores) there may be in the material presented for disinfection, either at quarantine-stations or in public institutions. It is understood, however, that there should be a proper apparatus and that the work should be carefully done by a competent operator.

TABLE XIV.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 5 minutes.

Plague:

1. Newspaper, 16 pages	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	No growth.
4. Book, 600 pages	No growth.
5. Blanket	No growth.

Diphtheria:

1. Newspaper	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	No growth.
4. Book, 175 pages	No growth.
5. Blanket	No growth.

Anthrax:

1. Newspaper, 16 pages	No growth.
2. Newspaper, 1 pound	No growth.
3. Newspaper, 2 pounds	No growth.
4. Book, 600 pages	No growth.
5. Blanket	No growth.

TABLE XV.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 5 minutes.

Plague:

1. Sheet of paper and envelope	No growth.
2. Book, 600 pages	No growth.
3. Newspaper, 1 pound	No growth.
4. Newspaper, 2 pounds	No growth.
5. Blanket	No growth.

Diphtheria:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Book, 250 pages | No growth. |
| 3. Newspaper, 1 pound | No growth. |
| 4. Newspaper, 2 pounds | No growth. |
| 5. Blanket | No growth. |

TABLE XVI.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 10 minutes.

Plague:

- | | |
|---|------------|
| 1. Disks in book, 600 pages, book tied | No growth. |
| 2. Disks in single blanket | No growth. |
| 3. Disks in package of newspapers, 3 pounds | No growth. |

TABLE XVII.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 10 minutes.

Plague:

- | | |
|----------------------------------|------------|
| 1. Almanac, 30 pages | No growth. |
| 2. Magazine, 15 pages | No growth. |
| 3. Magazine, 150 pages | No growth. |
| 4. Book, 600 pages | No growth. |
| 5. Newspaper, 2 pounds | No growth. |

TABLE XVIII.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 15 minutes.

Plague:

- | | |
|--|------------|
| 1. Sheet of paper and envelope | No growth. |
| 2. Sheet of paper and envelope | No growth. |
| 3. Newspaper, 1 pound | No growth. |
| 4. Newspaper, 2 pounds | No growth. |
| 5. Mattress (Mexican moss) | No growth. |
| 6. Mattress (excelsior) | No growth. |
| 7. Blanket | No growth. |
| 8. Coats with disks in pockets | No growth. |

TABLE XIX.—WITH VACUUM.

Temperature, 230° F. Time of exposure, 15 minutes.

Plague:

- | | |
|----------------------------------|------------|
| 1. Newspaper, 2 pounds | No growth. |
| 2. Newspaper, 3 pounds | No growth. |
| 3. Blanket | No growth. |

Diphtheria:

- | | |
|----------------------------------|------------|
| 1. Newspaper, 2 pounds | No growth. |
| 2. Newspaper, 3 pounds | No growth. |
| 3. Blanket | No growth. |

Anthrax:

- | | |
|----------------------------------|------------|
| 1. Newspaper, 2 pounds | No growth. |
| 2. Newspaper, 3 pounds | No growth. |
| 3. Blanket | No growth. |

Experiments similar to the above have shown that a temperature of 230° F., with an exposure of fifteen minutes, is also destructive to the spores of anthrax.

In conclusion, I would reiterate what I have already said, that in order to procure the desired results in steam disinfection careful attention should be given to the selection of the steam-chamber; that a temperature of 230° F. and an exposure of fifteen minutes are required; and that for quick and effective work a steam-exhauster should be provided. These requirements are particularly needed at quarantine and other public disinfecting-stations. At these places it is entirely impracticable to open packages and spread them out for exposure, consequently the matter of penetration must always be carefully considered. It will be seen in the tests made with low temperatures that the pressure in the chamber was practically zero, and, as might be inferred, the penetration was ineffective. If this is the result in a tight chamber, it cannot be expected that any safe or satisfactory result can follow where steam is indiscriminately introduced into a living-apartment or in a dwelling or on board a vessel. This I know has from time to time been advocated. I do not believe that a living-apartment or hold of a ship can be made sufficiently tight or can be subjected to a steam-pressure great enough to disinfect its contents properly. Leaks are sure to occur, which tend at once to render the steam ineffective as a germicide. If it should be desired to disinfect the hold of a ship, and steam should be selected as the agent, it is apparent that a temperature applied to the inner surface of the hull of the vessel below 155° F. would be unsafe to depend upon. There is no question that the organisms which would be found in an infected hold would, in part, rest upon the inner sides of the vessel. Wooden ships are becoming a thing of the past, and iron ones are being substituted. These rest in water the temperature of which is always low, and a superficial consideration will show that as the result of conduction the hull is always cold. I do not believe the low temperature of the hull can possibly be raised to a sufficient degree by the amount of steam which can be thrown into this part of the vessel, taking into consideration the numerous leaks which are always present. Fortunately, the ship's hold and cargo are rarely infected, and are too frequently subjected to a worthless disinfection.

REVIEWS.

TRAITÉ DE MÉDECINE ET DE THÉRAPEUTIQUE. Publié sous la direction de MM. P. BROUARDEL, Membre de l'Institut, Doyen de la Faculté de Médecine de Paris, Médecin de la Charité; A. GILBERT, Professeur agrégé à la Faculté de Médecine de Paris, Médecin de l'hôpital Broussais; et J. GIRODE, Médecin des hôpitaux de Paris, Auditeur au comité d'hygiène publique de France. Tome premier, Maladies Microbiennes. Pp. vii., 818. Paris: J. B. Baillière et Fils, 1895.

TREATISE ON MEDICINE AND THERAPEUTICS. By BROUARDEL, GILBERT, and GIRODE. Microbial Diseases.

To adequately review this, the first of the series of ten volumes, would require far more space than can be spared in the press of important matter which so constantly crowds our pages. Therefore we must content ourselves in calling attention to the salient points of this, an epoch-maker among the Systems of Medicine. At the outset, this volume—devoted to a discussion of the diseases of parasitic origin—stands unique in that not only the best and most carefully reached results of laboratory study are presented, but equally the conclusions of practised clinicians arrived at from painstaking analysis. It is but a few years ago that bacteriological work might have been truly said to have been barren of therapeutic suggestion. Today the practitioner, be he physician or surgeon, must keep himself in touch with the latest and best from the laboratory if he strives for his highest success. The Introduction, Microbian Diseases in General, by M. J. Girode, is brilliant. To one who has followed the subject, as the current literature affords examples, the extent and the intimate relationship of this subject with that of practical work come as a revelation. We venture to predict that upon this chapter many papers, yet to be written, will be based. Of the special subjects, Variola, by M. B. Auchè, bears testimony to the value of preventive measures, but does not pass upon the most recent but not yet successfully demonstrated exhibitions of serum-therapy. M. H. Surmont takes up Vaccine, covering substantially the same ground which has been so recently traversed in the literature brought out by the anniversary of Jenner, and in it the antivaccinationists can find but little comfort, for all that he spares these a recital of the bitter lessons taught at Gloucester. M. L. Galliard considers Varicella, denying its relationship with vaccinia, varioloid, and variola, although admitting that this opinion may be modified by future bacteriological experiments. A discreet and carefully prepared section is that upon Scarlet Fever, by M. R. Wurtz, although the treatment should have received more attention. The generally neglected subject of Measles is thoroughly and ably presented by M. J. Grancher, while

M. M. Netter devotes a brief chapter to so-called German Measles, especial attention being given to its non-identity and differentiation from the former. Miliary Fever, of interest chiefly to the well-informed physician, has been intrusted to M. L. Thoinot. The extensively written-about epidemic Influenza receives careful treatment by M. A. Netter, who assigns Pfeiffer's bacillus (1892) as the causative agent. His treatment is symptomatic, and he warns against the use of antipyretics in large doses; we could wish that upon this point he had been more emphatic. The same author takes up Dengue, as it seems, in a somewhat perfunctory manner. We are of the opinion that the disease must be observed or experienced to be properly appreciated. Whooping-cough and Mumps are both discussed by MM. A. Legroux and L. Hudelo, who are rather verbose and offer, beyond an excellent summary of existing knowledge, but little of novelty. For Diphtheria we have M. J. Grancher, who is here assisted by M. P. Boullache. We read this chapter with interest, for here therapeutics has received most signal assistance from the laboratory. This is short but satisfactory, temperate in tone, and our only regret is that the more recent developments could not have found a place and made more emphatic their conclusions, which were reached in November, 1894. M. F. Widal writes upon Streptococcal Disease and Facial Erysipelas in a masterly manner, omitting only the work of Marmorek. M. J. Courmont gives an excellent presentation of the rôle of the staphylococcus in pathology (Staphylococcal Diseases). Why may we not now transfer *staphylococcie* to our language? As our disease-concepts become more exact, our nomenclature must be more precise. An exceedingly tersely written chapter is that by M. L. Landouzy on Pneumococcal Disease. Here the pneumococcus is studied apart from acute fibrinous lobar pneumonia. Following Foa, the micro-organism may be (1) the pneumococcus proper, oedematogenous acting by its toxins, or (2) the meningococcus, fibrinogenous acting by sepsis. The relationship of the diseases formerly considered to be distinct was suggested, on clinical grounds only, by us in 1887. The hope in the direction of therapy evidently lies in immunization. M. A. Gilbert considers the *bacterium coli commune* in its distribution, physiological and pathogenic rôle (colibacillosis), and closes by stating that this may be a useful germ or a vigilant enemy. Thus far have we read this volume with great satisfaction; it presents the various subjects with but little departure from the high standard set in the Introduction. Ordinarily, when a conjoint work receives the criticism that its sections are of unequal value, the real significance is that some are excellent, others good, and some hopelessly bad. In this volume we find none unworthy of the subject or of the author. Yet excellent as it is, the final chapter upon Enteric Fever, by MM. P. Brouardel and L. Thoinot, is most remarkable for its thoroughness, for its logical deductions, for its scholarly presentation, and for its scientific breadth. We well remember the Brouardel of our student days—clear-headed, earnest, and learned—but much as we have expected, here we rest satisfied. In its completeness we note only the omission of so-called myoidema, which is frequently found in the later periods of the disease. We would especially call attention to the summary: (1) combined use of antipyretics, cold lotions, or wet-sheet and tonics, mortality 11.97 per cent.; (2) quinine and tepid baths, 7.33 per cent.; (3) quinine in benign and cases of moderate severity, and daily

cold baths, 68° to 86° F., in severe cases, 7.33 per cent. These to be considered in connection with Brand's method, 9.92 per cent. mortality. The authors admit that the method which is apparently gaining ground is that of Brand, due largely to the enthusiasm of its adepts, its apparent simplicity, its inflexible rules which relieve the practitioner of all investigation as to indication in obliging him to follow a route which is mathematically worked out. It is fair to recognize its success in severe and malignant cases, for which it should be exclusively reserved. With this chapter, a monograph in itself, we place the book upon our shelves conveniently for reference. The boundaries of medicine have so rapidly widened, the field has been so thoroughly tilled that no single brain can adequately present nor one book contain its well-proved facts. We trust that the succeeding volumes, with their numerous contributors, will maintain the high scientific standard, show the same conciseness, and aim to satisfy the necessities of the advanced physician as does this.

R. W. W.

DISEASES OF INFANCY AND CHILDHOOD. By L. EMMETT HOLT, M.D.
Svo., pp. 1117. New York: Appleton & Co., 1897.

ONE of the most striking of the many happy qualities of Dr. Holt's book is its completeness; another is its originality; and, perhaps equally prominent with either, is the care shown in its composition. The author has been a number of years in the actual construction of the volume, and has been peculiarly well fitted for his task by the most favorable opportunities for extended experience in the study of the diseases of children, both on the living subject and at the post-mortem table. If we add to these advantages a certain methodical quality of mind, with faculties of analysis and judgment and a knowledge of the needs of the student, we find all the chief requirements for the production of a successful book. That the work is an excellent one, even a superficial glance shows, and careful reading of it adds to one's good opinion. The presswork is good, the illustrations as numerous as the requirements demand, among them being a number of colored plates.

Looking more particularly into the subject-matter of the volume, we find it difficult to pick out any subject for special praise as compared with others. Perhaps most noteworthy is the section on feeding of infants, which is an elaborate study, with special emphasis upon the modifications of milk to produce definite percentages of the normal constituents. This section will be found invaluable by physicians wishing to practise home modification of milk in a thoroughly scientific manner.

Useful, too, and eminently practical, are the introductory remarks on the hygiene and care of children, on growth and development of the body, and on peculiarities of disease in children. The section on the diseases of the digestive system is very satisfactory. It contains, among other matters, a series of illustrations showing the size of the stomach at different ages, with useful remarks on the physiology of digestion in infancy. We note with especial pleasure a very satisfactory article upon cyclic vomiting, regarding which little or nothing is to be found in most text-books. The remarks on "acute gastro-enteric infection," as the

author designates summer diarrhoea and allied forms, are thoroughly up to date. The photographs and drawings in the article on colitis and ileocolitis are exceedingly fine. The article on stomatitis leaves one somewhat in doubt regarding the nosological position of some of the instances of house epidemics of an ulcerative disease of the mouth which are occasionally seen. We note also the statement, with which certainly all writers are not in accord, that quinsy is always a unilateral disease.

In the chapter on respiratory affections we observe with particular pleasure the beautiful photo-micrographs of pneumonia of different forms. The article upon this disease is very complete.

Diseases of the circulatory apparatus open with one of the clearest descriptions of congenital cardiac lesions and their symptoms with which we are acquainted.

To review at length the remaining sections of the volume would serve no good purpose. We may merely mention in passing the very useful general remarks on the character, quality, and method of collecting urine in infancy, and on some of the minor affections of the urinary apparatus, often neglected by writers; the articles on convulsions, meningitis, cerebral tumor, and adenitis; and the section on infectious diseases, particularly upon diphtheria. We fail to find any mention of the family form of spastic paraplegia, either of the cerebral or spinal type, and we regret to see anterior poliomyelitis called "infantile spinal paralysis," as this seems a step backward in exactness of nomenclature. Glandular fever is not spoken of—perhaps intentionally. The term "anginose" is omitted in writing of the form of scarlet fever usually described under this title. Erythema exudativa (on page 815) should, of course, read erythema exudativum.

Yet these criticisms are merely upon secondary matters. As to the work as a whole, it is a sincere pleasure to possess it, to read it, and to realize that it is such a credit to American medical book-making.

J. P. C. G.

MITTHEILUNGEN AUS DEN GRENZGEBIETEN DER MEDIZIN UND CHIRURGIE.
Redigiert von J. MIKULICZ (Breslau) and B. NAUNYX (Strasburg). Erster
Band. Drittes Heft. Jena: Verlag von Gustav Fischer, 1896.

CONTRIBUTIONS FROM THE BORDERLAND OF MEDICINE AND SURGERY. By
J. MIKULICZ and B. NAUNYX

NOT long since (*AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, April, 1897), we noticed one part of the first volume of this excellent work. Another part reaches us now with ten contributions instead of a single one. We can only give a few notes of some of the more important.

The first paper is by Bandler, on The Influence of Chloroform and Ether on the Liver. He reports the case of a man who was operated on for hernia, the operation lasting an hour, chloroform being used as the anæsthetic, and no iodide or bichloride being used. On the day after the operation he developed jaundice, and on the fourth day died soporose. The post-mortem examination disclosed the fact that he died with acute yellow atrophy of the liver, together with a fatty heart and chronic Bright's disease. Bacteriological infection was excluded at the post-mortem; no other cause apparently existed, therefore, except the chloroform.

Many years ago Casper pointed out the possibility of such after-results from chloroform, and the investigation made by the author on dogs, as well as the post-mortem on his patient, seemed to establish the fact that occasionally such a result may follow.

The next article is by von Jakseh, on The Treatment of Malignant Tumors with the Erysipelas Serum of Emmerich-Scholl. The conclusions which he reached are very much the same which both experience and observation have impressed upon our own mind as to the use of the erysipelas serum of Coley. The author says "the present serum does not enable us to reach our object. Its employment brings dangers and great suffering for the patients, so that after the large number of serious accidents following its use in a relatively small number of cases I cannot advise its further clinical use."

Siegel and Heinshaimer complete two interesting articles on operations on the stomach.

Gerhardt and Lauenstein have papers on Perityphlitis. It seems strange that eleven years after Fitz's convincing paper our brethren, both in England and especially, perhaps, those in Germany, still adhere to the pathologically erroneous name perityphlitis.

Franke reports an interesting case of Recovery from Mucous Colitis by the Establishment of an Artificial Anus. Our own experience as to the ease with which patients can take care of an artificial inguinal anus and the comfort which they derive from such operative procedures in suitable cases makes us very much more willing than formerly to use this method in the treatment of cases of such gravity as to demand it. Such patients can go about with ease and comfort not only to themselves, but to all about them, since no one would know that an artificial anus had been established in the majority of the cases.

In the paper of Berkhan on the Treatment of a Diverticulum of the Oesophagus, we cannot but be struck with the immense superiority of the surgical over the medical treatment. A clergyman, aged fifty-two years, was under treatment for three months. The oesophagus was dilated by a bougie of suitable curve, which, however, it took eight days of repeated experiment to pass into the stomach. After that the bougie was introduced eighty-five times, and the patient declared that since the beginning of the treatment he had never been able to swallow so well. He wished to learn the technique of the operation himself, so that he could resume his occupation without requiring the constant aid of the surgeon. A curious commentary on this statement follows. Before this suggestion could be carried into effect it became entirely impossible for him to swallow, and after several days of rectal feeding the patient died exhausted.

A case of Professor Hearn, on which he operated at the Jefferson Medical College Hospital, presented a very different and striking contrast. The diverticulum was exposed by a vertical incision at the side of the neck; it was cut away, the margins were inverted and united by Lembert sutures, precisely as in any other part of the digestive tract; primary union took place; in a week the patient was up and about, and has had no trouble since. Surely with such a contrast, especially with the death of the one patient after three months of treatment, and the entire recovery of the other in one week, the choice of methods is easily made.

Two other articles, on Wandering Neuritis after Traumatism, by Krehl, and a case of Hematomyelia Combined with Traumatic Spondylitis, by Henle, complete this interesting number. W. W. K.

A SYSTEM OF PRACTICAL THERAPEUTICS. Edited by HOBART AMORY HARR, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital. Vol. IV. With illustrations. Pp. ix., 1062. Philadelphia and New York: Lea Brothers & Co., 1897.

THE purpose of this volume is to present the real advances which have been made in the treatment of disease since the three composing the system have been completed. It practically not only brings the work down to the present, but, on account of many changes among the sub-editors, gives a broader treatment of some of the subjects.

We are in accord with Dr. Simon Baruch in claiming great advantage in the use of public rain-baths, and welcome their more extensive introduction. The sentence "the *public rain-bath* has also been freely ventilated" is scarcely felicitous. As for the rest of "Hydrotherapy in Disease," we find the more recent contributions considered, but the very important paper of Porter omitted. We appreciate the arguments for the method, and feel that if its value should not receive fuller recognition it will not be for lack of energy or enthusiasm on the part of its devotees. Under the heading of "Mineral Springs," Bad Nauheim receives much attention, but is more fully discussed by Henry (pp. 379 *et seq.*). Dr. S. Edwin Solly reviews the "Present Treatment of Tuberculosis," taking up tuberculin, anti-streptococcal injections, nuclein, antiseptic, and other drug treatment. So far as concerns creosote, we believe the author to be in the wrong when he assumes that the good results obtained from this drug to be due to the fact that only patients with good digestion can take it, and others are dropped from the roll, and thus are not counted. There are creosote preparations which are readily taken by persons whose digestions are impaired, so that we believe that the fault is not with creosote, but with the preparation. The monograph of Audeoud is too valuable that he should appear as Audeon (page 48). We agree with the editor in preferring camphoric acid for night-sweating to zinc, recommended by the author; this in our experience may be effective, but most certainly interferes with digestion. The question of climate is distinctively within the province of the author, and we note with pleasure his very fair presentation and sound advice, to which even more space could have been advantageously given. Dr. Edward Martin offers a practical chapter upon the "Present Treatment of Syphilis," to which no exceptions should be taken, for its value is that of a monograph. "Typhoid Fever and Malarial Diseases" have been entrusted to Dr. J. M. Anders. He reviews hydrotherapy fairly, recognizing what many of its followers apparently ignore, "the supreme importance of adapting the means to be employed to the case in hand rather than to the disease in general." Of special medication the author speaks with indefiniteness, although offering some important suggestions. In the second division of the subject we find nothing of especial novelty.

The editor, Dr. H. A. Hare, presents the subjects of "Influenza, Scarlet Fever and Measles, Diabetes Mellitus, and Intestinal Parasites." We confess our surprise that the bacillus of Pfeiffer is not recognized as associated with influenza, especially since the work of Canon has been published, and that Ingals, who takes up this disease from another standpoint, apparently is of the same opinion. But this does not lessen our appreciation of his (Hare's) sound, practical treatment of this subject, nor of the next, which is scarlet fever. Of measles, however, we think more might have been said. If the author is correct in his statement that "the necessity for treatment of measles is usually in direct proportion to the bad handling of the case from a hygienic point of view, unless the attack be uncommonly severe or the patient be already weak and feeble, and so unable to resist disease," should we not justly expect more than a half page upon which to point out the hygienic precautions which, omitted, result in "bad handling?" We criticise this defect not because of the lack of information on the part of the author, but because he is not just to his reputation as to thoroughness. Dr. E. Fletcher Ingals presents an exhaustive chapter upon the "Diseases of the Nasal Chambers and Associated Affections," quite profusely illustrated. Dr. D. Braden Kyle follows with a fair discussion of the "Diseases of the Uvula, Pharynx, and Larynx." "New Facts and Methods in the Treatment of Diphtheria" is the subject assigned to Dr. William Halleck Park, which comes to us in fairness and conciseness. We would have more fully indorsed his conclusions had Health Board figures, so notoriously untrustworthy, been eliminated. As it now stands, the horse is apparently the source of the greatest danger in the antitoxin treatment. Dr. Norman Bridge takes up "Asthma, Bronchitis, and Whooping-cough" in a very interesting manner. "Pleural Effusion and Empyema, Abscess, and Gangrene of the Lung" is entrusted to Dr. A. J. McCosh. This should be read in connection with the following chapter, that a complete presentation may be obtained. This is by Dr. James B. Herrick, and is entitled "Pneumonia, Croupous and Catarrhal, and Pleurisy." The treatment of pneumonia is rather a *résumé* of modern methods than of recent progress, and we are of the opinion that a proper consideration should include not only problems from the bacteriological, but as well from the mechanical standpoint. We deem the chapter a suggestive one, and worthy of study and subsequent reflection. Dr. Frederick P. Henry takes up the "Diseases of the Heart" in a thoroughly systematic manner. He has not advanced the method of baths and resistive exercises as a panacea for all circulatory disturbances, apparently recognizing that some of the British monographs upon the subject unconsciously are contributing to the amusement of the thoughtful physician. Dr. Ralph Stockman contributes a short but satisfactory article upon the "Diseases of the Blood," while the "Diseases of the Liver" receive inadequate notice by Dr. Joseph Eichberg. Dr. S. J. Meltzer not only gives us a readable chapter upon "Diseases of the Thyroid and Thymus Glands, Myxœdema, Cretinism, Graves's Disease, and Obesity," but adds a very creditable bibliography. Dr. Thomas G. Ashton presents "Diseases of the Stomach" in a way which shows his thorough acquaintance with the literature, although the practical physician may wish for definiteness in some statements. Dr. George Ryerson Fowler goes over the subject of "Peritonitis" and its allied conditions, including "Obstruction of the Bowels,"

without presenting much of novelty. His advice seems to be sound from the physician's standpoint. Dr. Joseph M. Matthews gives an exhaustive study of the "Diseases of the Rectum and Anus." "Diarrhoeal Diseases and Dysentery," by Dr. W. W. Johnston, is far too brief, discursive, and scarcely satisfactory. "The Modern Treatment of Diseases of the Skin," by Dr. H. W. Stedwagon, is rightly entitled, although we wonder how scorbutus came to be assigned to a dermatologist when the skin manifestations, if the most striking, are certainly not the most important. For clearly cut, positive statements, Dr. Joseph Collins on the "Spasmodic Affections of the Nervous System" should be commended. The statements are not all new, but the treatment of the subject is original, and every page bears the impress of the author's personality. A very much needed chapter is that upon "Drug Habits," by Dr. F. X. Doreum, who is brief but satisfactory. Dr. Hugh T. Patrick, on the "Disorders of Sleep," gives the reader valuable distinctions between different states and important therapeutic suggestions. Dr. Nathan S. Davis, Jr., takes up the subject of "Therapeutics of Renal Diseases." While there is much of importance, we believe that the time has come when renal degenerations should be sharply separated from inflammations. "The Therapeutics of the Diseases of the Female and Male Genito-urinary Tract" is by Drs. E. E. Montgomey and William T. Belfield, respectively, and both traverse the border-line of surgery. Dr. Casey A. Wood takes up the "Treatment of Diseases of the Eye," and Dr. S. MacCuen Smith "The Ear," from the standpoint of the general practitioner; the former is noticeable for the number of prescriptions.

We have noticed the different authors with more than usual completeness, for, unlike most conjoint works, this does not contain a hopelessly bad chapter. We congratulate the editor that he has been able to secure such varied and representative ability to the end that this volume represents the present status of therapeutics, and, further, that his supervision has resulted in so few instances of contradictions and overlapping. We predict for this volume a success equally satisfactory as that accorded to its predecessors, for we believe it is deserved. R. W. W.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Local Action of Tetanus Toxin.—DR. R. L. PITFIELD, having injected this substance into the calf of his left leg, found that it was more irritating than an ordinary hypodermatic injection, and the parts became rapidly more and more painful. An hour afterward the leg hurt considerably; there was no increase in any reflexes; the body-temperature had risen one degree above normal; there were headache and giddiness. Two hours later the temperature fell to normal, but the pain became intense; there was spasm of the fibres of the muscles, which became greatly aggravated with use. The only manifestation of the poison was local, but it was most severe, and lasted twelve hours. It is suggested that this treatment might be of use in subacute or chronic myelitis, especially in children. The patients, of course, would gradually become immune to the poison. In case of accident the antitoxin could be used.—*Therapeutic Gazette*, 1897, No. 3 p. 145.

Antistreptococcic Serum in Severe Puerperal Septicæmia.—DR. ARTHUR W. SHARP reports a single successful case. In this there were injections of two and one-half drachms on the fifth, sixth, and seventh days, and of an ounce on the eighth day of the disease. Convalescence was established upon the fifty-third day, although the temperature reached the normal at the thirtieth. The serum was injected into the abdominal fat and the following precautions taken: syringe and needles boiled, skin scrubbed with soft soap, then with 2 per cent. solution of lysol; next dusted with boric acid, and finally a dressing was applied. No inconvenience whatever resulted from any of the punctures, and the patient's appetite was markedly stimulated. The following conclusions are presented: (1) If proper precautions are taken, the risks attending the use of the serum may be neglected. (2) Although no streptococci were found in the blood, benefit attended the use of the serum. (3) In really serious septic cases corrosive sublimate (1 to 2000),

used fearlessly, is the only reliable antiseptic. (4) In septicæmia after labor the focus of mischief may be other than uterine.—*British Medical Journal*, 1897, No. 187, p. 519.

Traumatic Tetanus.—DR. LUDWIG RABEK reports a single successful instance of the use of antitetanin. The immunizing strength was one thousand millionth of the body-weight. The dose of this was from 12 to 24 drachms. One week after the injury characteristic symptoms supervened, and the treatment was begun a week later with the minimum dose. On the following day the maximum dose was given and repeated four days later. Convalescence was established at the end of a week, although the abscess resulting from the second injection required two weeks more for its healing. The age of the boy (six years) and the rapid improvement add to the interest of the case.—*Therapeutische Wochenschrift*, 1897, No. 10, S. 226.

[The value of the remedy is not so clearly demonstrated in chronic as in acute cases, yet the reported successes belong chiefly to the latter class.—R. W. W.]

Holocaine, a New Anæsthetic.—DR. G. GUTMANN presents this, which is p-diethoxyethenyldiphenylamidin, as an advantageous substitute for cocaine. This is a crystalline base from which is formed a chloride, the latter soluble up to $2\frac{1}{2}$ per cent. in cold water. Boiling does not decompose a 1 per cent. solution, which is also permanent even if left in open vessels. This is the solution employed in thirty cases. Two to five drops are instilled, causing a slight burning sensation which disappears within a minute. Three to five drops produce within a minute a total anæsthesia of the cornea which lasts, upon an average, nine minutes, during which the corneal surface remains moist and clear. In one instance four drops produced so complete an anæsthesia that the galvanocautery was used, without pain, upon a corneal ulcer. In all cases the tension was unchanged, and the pupils showed neither myosis nor mydriasis, nor was the accommodation altered. The disadvantages of this anæsthetic are its limitation to operations where its effect can be obtained by instillation, for when administered hypodermatically it is poisonous. Further, it can be sterilized only in vessels which are free from alkali; those of porcelain are recommended.—*Deutsche medicinische Wochenschrift*, 1897, No. 11, S. 165.

Antipneumococcic Serum.—DR. J. W. WASHBOURN gives an account of the immunization of a pony, and reports two cases of pneumonia treated with the serum. The pony was first injected, into the subcutaneous tissue of the shoulder, with broth cultivations of the pneumococcus heated to 140° F. for one hour, then with living agar cultivations, and lastly with living broth cultivations. The injections lasted for four months. Five months after the last injection the animal was bled and the serum found to possess marked protective properties. Having obtained a serum of known strength, he made use of this in two cases. Of these he remarks that the injection of the serum in the first was followed on both occasions by a fall of temperature, and on the day after the second injection the crisis occurred. Inasmuch as this was the ninth day of the disease, it is difficult to say

whether the result was due to the treatment or not. The attack was a fairly severe one, but the pulse was good before the serum was administered. The second patient, though young, was a bad subject for pneumonia on account of his intemperate habits. The attack was a severe one, and both lungs were affected. There was a good deal of delirium; the pulse was 140, and the heart showed signs of dilatation on the second day of the disease. The serum appears to have exerted a beneficial effect upon the disease. On the day after the first injection the pulse-rate had fallen from 132 to 112. The process in the left lower lobe never advanced after the treatment was begun. It will be observed that the serum was injected at an early stage—namely, on the third day of the disease. In both cases an urticarial rash was observed during convalescence, similar to the rashes occurring after injection of antitoxic and antistreptococcic sera. Since no satisfactory toxin has been obtained from cultivations of the pneumococcus, it is impossible to say whether this serum possesses any antitoxic power. The serum should be injected into the subcutaneous tissue, and strict aseptic precautions taken. The skin should be well washed with an antiseptic and the syringe well boiled immediately before use. Five drachms (660 units) should be injected, twice daily, until the patient is convalescent, commencing as early as is possible.—*British Medical Journal*, 1897, No. 1887, p. 510.

[Those who consult the original should note that the first temperature-chart is reversed.—R. W. W.]

Parthenium Hysterophorus.—DR. H. V. ARNY gives a careful botanical description and chemical analysis of this plant, which is found in great abundance in Jamaica and Louisiana. Although no alkaloid or glucoside was found by the author, Ulrici claims an alkaloid which he named parthenicine. There was isolated, however, a substance, which is named parthenin, a proximate principle, varying in amount according to time of collection, but reaching the maximum in July (1.13 per cent.). Tovar reported it as a remedy for facial neuralgia, and it also proved beneficial in a case of fever and anæmia where quinine failed. Guyer confirmed its efficiency in neuralgia, especially of the cranial variety, but found it utterly without effect as an antipyretic. In Jamaica the plant is used as a remedy in ulcerated sores and in herpetic or pustular skin diseases. Of parthenicine, grain doses may be given every hour in neuralgia, while fifteen grains are used in intermittent fever.—*American Journal of Pharmacy*, 1897, No. 4, p. 169.

Spermin.—DR. G. HIRSCH quotes the statement of Poehl (1892) that, without exception, all organs used in therapeutics contain spermin, which plays the part of a physiological-chemical ferment of tissue-respiration and outside the body sets in motion oxidation-processes. Instances of its use in anæmia, tabes, and endarteritis obliterans are reported, and various authors cited, from which the conclusion is reached that the drug has no specific action in a given disease, but rather that it regulates internal oxidation, increases metabolism, removes excrementitious products which injure the nervous system, and gives the *vis medicatrix nature* undisturbed operation.—*St. Petersburger medicinische Wochenschrift*, 1897, No. 7, S. 51.

Gelsemium.—PROF. L. E. SAYRE has made a careful microscopical study of the root, and has come to the conclusion that the drug as found in the market is composed not only of the rhizome and root, but also of the stem, in varying proportions; the stem is an adulterant, since it has no medicinal value. An analysis of these parts is promised by the author, and when completed we are likely to know the reason for the great variations in therapeutical activity so often observed.—*American Journal of Pharmacy*, 1897, No. 1, p. 8.

Camphoric Acid in the Treatment of Night-sweats.—DR. H. A. HARE finds that this remedy controls the sweating of tuberculous patients in the great majority of cases and does not produce any disagreeable symptoms, such as are usually caused by atropine or other powerful antisudorifics. Twenty grains are ordinarily quite sufficient to control the sweat, provided the dose is given early enough to be absorbed before the time at which the sweating appears. Other observers have shown that as much as sixty grains may be given without any deleterious effect. The drug may be given in cachet, dissolved in whiskey or brandy, placed in dry powder upon the tongue and washed down with a little water or milk; but as it is slowly absorbed, it should be given an hour or two before the anticipated time of the sweating.—*Therapeutic Gazette*, 1897, No. 3, p. 164.

Treatment of Leprosy.—DR. DOMENICO FORNARA practises inunction and injections of airol [bismuth oxy-iodogallate]. The inunctions are of 10 per cent. solutions of the drug in vaseline, which give also the beneficial results from massage. For injections into the leproma the following formula is employed: aristol, 5; glycerin, 35; distilled water, 10. The inunction is performed over the whole body at night; the next morning the patient takes a warm bath, and during the day the *phagrus* and tubercles are injected. For the nose and throat the powder is insufflated, or, in case this is not well borne, the parts are painted with the ointment. The drug is undoubtedly absorbed and enters the blood as iodine, bismuth, and gallic acid, in a nascent state, and this gives rise to a vigorous antiseptic action. During the early days of its administration by subcutaneous injection there appear dyspnoea, feeble heart-action, and reversed gastric peristalsis. Later appears a gray line at the junction of the gums with the teeth, which is attributable to the bismuth, while the other symptoms are caused by the gallic acid.—*Therapeutische Wochenschrift*, 1897, No. 12, S. 71.

Treatment of Chlorosis.—DR. H. HENRIARD divides the patients into three classes, with whom (1) iron is useless, (2) harmful, or (3) very useful. Chlorotics of the first degree (Hayem) need rest, proper diet, and country air, and iron is useless. In the second class should be placed the dyspeptic chlorotics who may suffer from *hyper-* or *hypochlorhydric*, gastric dilatation, gastro-intestinal fermentations, or gastric ulcer; here the dyspepsia must be treated first; but if iron is first administered, it will be found that it is harmful. Iron will be useful in these patients later, when administered as an oxalate or lactate up to five or seven grains daily. For the irritable chlorotics both sea-air and high altitudes are objectionable, as are also long

journeys. For this class Gérard-mer, La Bourboule, Evian, or Saint-Gervais is indicated. The torpid chlorotics require sea-air or the muriated arsenical waters of Bourboule or weak sulphur waters. The treatment is summed up in three words—rest, air, and iron. Much of the first two, but little of the last.—*Bulletin Général de Thérapeutique*, 1897, 5e liv. p. 149.

The Use of Iodothyrim in Diseases of Children.—DR. FRIEDRICH LANZ reports the results of the use of this remedy in twelve cases of struma. From these he concludes that this is a remedy for parenchymatous struma; in comparison with other iodine preparations this contains as much as the fresh thyroid gland, and relieves in a much shorter time, and only exceptionally presents disadvantages, and these of slight importance. With this, as with iodine, its disuse results in relapse.—*Therapeutische Wochenschrift*, 1897, No. 11, S. 247.

The Use of Levulose in Diabetes.—DRS. E. DE RENZI and E. REALE found that eight diabetic patients could completely oxidize this substance in daily amounts of from six to twenty-five drachms. In artificial diabetes (dogs after extirpation of the pancreas) no sugar of any sort was found in the urine after its administration. Further than this the use of levulose not only does not increase, but rather diminishes the amount of nitrogenous output, both urine and feces being examined—*Wiener medizinische Wochenschrift*, 1897, No. 9, S. 379.

Diabetes.—DR. T. H. KELLOGG states that the simple form is readily controlled by restriction of the dietary and general increase of oxidation-processes by means of vigorous Swedish movements, cool shower-baths followed by brisk rubbing, the Scotch douche, and the inhalation of oxygen. If there is an excessive amount of organic waste, as shown by increased nitrogen oxidation, the patient must rest in bed and avoid massage and passive movements. Warm baths, tepid sponging, and tonic applications of electricity should be administered. The diet should consist chiefly of butter-milk and well-cooked preparations of milk. An excessive meat-diet is objectionable in all forms, especially in the grave. If there is diminished oxidation of proteids, there is special danger that the system will not relieve itself of the normal tissue-poisons, so that the addition of toxic elements, which are always present in the flesh of dead animals, may precipitate an attack of coma. Restriction to a diet absolutely free from starch is not required, as the system requires a certain amount of carbohydrates. The gluten of wheat, either pure or with the greater portion of the starch removed, is an invaluable food. Most of the gluten flour and preparations are fraudulent in that they contain practically no less starch than is found in ordinary wheat-flour. It is believed that soja beans, which contain only 11 per cent. of starch and an equal amount of sugar, with 35 per cent. of proteid matter in the form of true albuminoids, and 1 per cent. of a very digestible fat, will be found useful in this condition.—*Modern Medicine*, 1897, No. 3, p. 57.

The Physiological Action of the Cold-bath Treatment—DR. WILLIAM HENRY PORTER credits Mathewson as among the first (1860) in this country

to use the application of cold to the surface of the body with a view to lowering temperature. When the fever-heated patient is stripped and wrapped in a cold sheet, or sponged with tepid or cold water, alcohol and water, or is placed in a cold bath, these cause a decided increase in the radiation or excretion of heat from the surface of the body, and cool the blood circulating in the cutaneous capillary bloodvessels; thus the blood sent back to the deep or excretory organs is a shade cooler than obtains before the bath. These changes do not increase the excretion of the toxins; therefore the result of the bath, if this is all that can be accomplished by its use, is to subject the individual to great discomfort, and lower the surface-temperature for a very short time, without materially benefiting the pathological condition. The stimulating action of cold applied to the skin in this manner causes a contraction of the surface bloodvessels, and a large volume of blood is thereby transferred from the capillaries of the surface of the body to those that go to make up the splanchnic arcade and those of the deep and excreting organs. Thus the liver and kidneys are at once the seat of a large afflux of blood from the surface. When this change is brought about quickly, as it usually is, and the force of the heart is insufficient to fully sustain the sudden shifting of so large a bulk of blood from one vascular arcade to another, there result an intense congestion of the liver and kidneys, a slowing or arrest of the circulation in the kidneys, and a suspension of their functions, a great accumulation of toxins within the body, intense poisoning of the nervous system, followed in short order by death, which in this instance is directly traceable to the cold bath. If, on the other hand, the heart is sufficiently strong and properly sustained before, during, and after the bath, and provided the patient is also vigorously rubbed or massaged while in the bath, the congestion of the liver and kidneys may be quite as intense, but it is not followed by stagnation of blood in these organs and arrest of their functions. The circulation is actively maintained and the special toxins of disease and the faulty products of metabolism are more rapidly eliminated. The application of cold to the surface of the body, together with friction, acts reflexly upon the deep excretory organs, thus enabling the glandular system to maintain a better nutritive condition. The cold bath should be employed early in the disease, before the glandular organs have become badly damaged and prior to the intense weakening of the heart and the exhaustion of the nervous system. He denied that he was a strong advocate of the cold-bath treatment, for he had not placed a typhoid fever patient in a cold bath since 1887. This patient died of renal congestion and uræmia, probably hastened by the cold bath. Since so much has been recently said upon bath treatment, it seemed that inquiry into its physiological action would be interesting.—*The Postgraduate*, 1897, No. 3, pp. 113 and 156.

Poisoning by Potassium Chlorate.—DR. RECHSTOMER notes the instance reported by Romanow, of a woman of twenty-five years, who absorbed three ounces of this drug with suicidal intent. Death followed in six days. The necropsy disclosed fatty emboli in all the organs, especially in the small vessels and capillaries of the lungs. The author quoted, believing that under the influence of this poison the marrow of the long bones would be pro-

foundly changed, undertook some experiments upon dogs. These animals presented the same fatty emboli, but less generalized. Particularly was it noted that they were found in the capillaries and small arteries, and also large cells similar to those of the bone-marrow — *Journal des Praticiens*, 1897, No. 1, p. 14.

The Treatment of Syphilis by Hypodermatic Injections.—DR. JOSEF GRÜNFELD, so far as concerns ambulant patients, believes that this method is preferable to all others in the treatment of constitutional syphilis. The deep intermuscular injections of large single doses under antiseptic precautions is not followed by unpleasant complications or results. The position in this method is satisfactory, yet it does not secure the rapid curative effects of inunction. The formula which seems to be preferred is: corrosive mercuric chloride, 1.25; sodium chloride, 3; distilled water, 50.—*Centralblatt für die Gesamte Therapie*, 1896, Heft xii. S. 705.

M E D I C I N E .

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Malarial Hæmoglobinuria.—BASTIANELLI (*Le Emoglobinuria da Malaria, secondo i recenti Studi; Annali di Medicina*, Anno ii. Fasc. xi.) has recently contributed an excellent article upon malarial hæmoglobinuria, based not only upon the cases observed in Rome, but upon the careful analysis of the work of others. He asserts that it is practically proved that hæmoglobinuria occurs only in infections with the æstivo-autumnal parasite. The recent observations of A. Plehn tend to show that the cases analyzed by F. Plehn, as well as his own, were instances of æstivo-autumnal infection.

The manifestation is rare in Italy, commoner in Sicily and Greece, very common in the tropics. An interesting point is that hæmoglobinuria following quinine is extremely rare in Italy, no case having ever been reported from the Campagna. The frequency with which these cases occur increases, just as in cases of spontaneous hæmoglobinuria, as one passes South.

Hæmoglobinuria due to quinine never occurs excepting in patients who are suffering or who have recently suffered from malarial fever.

Spontaneous hæmoglobinuria may be at times intermittent, or, as is more common, in single paroxysms. He divides the spontaneous hæmoglobinurias into three classes:

(a) In the blood there are found æstivo-autumnal parasites of the pyrogenic

cycle—that is, young hyaline forms. Here the hæmoglobinuria occurs regularly in association with the segmentation of a group of parasites—that is, at the time of the ordinary paroxysm. This he terms the paroxysmal hæmoglobinuria.

(b) In the blood there are to be found only crescentic or ovoid bodies and pigmented leucocytes, or, possibly, pigmented leucocytes alone. Some of these patients come to autopsy while the blood is quite negative as regards parasites. They may also be wanting in the internal organs, but from the intravascular melanosis it may be seen that the parasites have disappeared quite recently. In this class the paroxysm of hæmoglobinuria is caused by the segmentation of a group of parasites which disappear spontaneously during the attack. The changes left in the blood and internal organs, however, are so great that the paroxysm continues for hours or days after the organisms have disappeared from the blood. Bastianelli terms this form the post-paroxysmal hæmoglobinuria.

(c) The blood examination is entirely negative, and the only evidence of there having been a malarial infection is the presence of an endothelial, periblobular, perivascular melanosis. The malarial process has come to an end some time previously. Here the attack of spontaneous hæmoglobinuria does not depend upon the presence of parasites, but starts without apparent cause. Such paroxysms may be intermittent and repeated at short intervals, but are more commonly single, of long duration and very severe. This form is especially grave, and is the “pernicious hæmoglobinuria” of Marchiafava, while Bastianelli calls it the post-malarial hæmoglobinuria.

As to the causation of the hæmoglobinuria, in all probability the parasites which produce the febrile paroxysm play an important part in some cases. An anæmic condition of the blood, however, seems to be indispensable for the production of the phenomenon, as the hæmoglobinuria does not occur with the first paroxysm, either in the initial attack or in a relapse. It is rare under any circumstances in the first attack, usually occurring with the first relapse or after repeated relapses. There is also in some cases an individual idiosyncrasy or predisposition.

Hæmoglobinuria does not occur in the most chronic cases of malaria—that is, in those cases where a certain equilibrium is established between the needs of the organism and the function of the hæmatopoietic organs—but in those cases where the organism is still liberating itself from the residue of the infection and in which anæmia and melanosis still exist.

Bastianelli, finally, takes up the hæmoglobinuria due to quinine. He asserts that:

(1) It occurs only in individuals in whom a malarial infection has preceded.

(2) The hæmoglobinuric attack is produced constantly every time that quinine is administered, whether it be given while the malarial attack is in progress (Pomasselli), or whether it be given when the malarial infection has run its course (Murri).

(3) Extremely small doses are capable of bringing on an attack.

(5) Quinine hæmoglobinuria has been seen in patients who have already suffered from spontaneous hæmoglobinuria (Murri).

Quinine hæmoglobinuria is rare, excepting in the tropics. No doubt there exist cases of hæmoglobinuria due distinctly to the administration of quinine.

Bastianelli says: "The preceding malaria creates the fundamental disposition; the existing malaria the accidental disposition; the quinine the provocative agent."

He divides quinine hæmoglobinuria into two forms:

(1) That occurring during the paroxysm—paroxysmal quinine hæmoglobinuria.

(2) Post-malarial quinine hæmoglobinuria.

In these varieties quinine, through a very considerable length of time, will produce a hæmoglobinuria whenever administered. There are, however, instances where the hæmoglobinuria due to the taking of quinine occurs only now and then during the paroxysm—that is, is an episode. These cases are rare.

Bastianelli comes to interesting and practical results with regard to treatment. The course pursued depends upon the blood examination.

If hæmoglobinuria occurs during a malarial paroxysm and parasites are found in the blood, quinine should always be given.

If, however, no parasites are found, either as a result of previous administration of quinine or on account of the spontaneous disappearance of the organisms, we may remember that the administration of quinine will have no effect upon this attack and that for the time being certainly another attack is not to be expected. In these cases Bastianelli recommends not giving quinine, owing to the possibility that the paroxysm may have been due to its previous administration.

If in an attack occurring in the middle of an ordinary malarial paroxysm there arises doubt as to its origin from quinine, it is well to abstain from the further administration of the remedy, for the quinine already given is usually sufficient to hinder the development of new febrile paroxysms. But if in a hæmoglobinuric attack which has come on after the giving of quinine the parasites are still found in the blood, one is justified, despite the danger, in insisting upon the specific treatment; if there be doubt as to the origin from quinine, we may be sure what the result will be if we allow the parasites to go on developing, and it is therefore safer to interfere.

[This careful abstract (for which we are indebted to Dr. Thayer) should prove of great value to those Southern practitioners who are interested in quinine hæmoglobinuria. The condition, so far as I know, is not met with in this latitude.—W. O.]

The Direction of Rotation in Cerebellar Affections.—RUSSELL (*British Medical Journal*, April 10, 1897), in a previous communication to the *British Medical Journal*, May 18, 1895, published the results of experimental work on animals, in which he had found that animals deprived of one lateral lobe of the cerebellum rotated away from the side of the lesion. Dr. Bruce Ferguson believed that Russell had fallen into an error of expression, and concluded from the latter's description that the rotation was toward and not away from the side of the lesion. Russell, in the present article, endeavors to substantiate his previous views, and states that the discrepancy in views arises from the fact that some describe the direction in terms relating to the observer, while others describe it in terms relating to the observed. He believes that in the case of the human subject, as well as in animals, there

would be less likelihood of a difference of opinion if all physicians observed two rules: (1) That the object should be placed in front of the observer, and that both should be looking in the same direction. (2) That the direction of rotation about a horizontal axis should always be expressed in terms relating to the direction in which that part of the circumference of the object corresponding to its upper quadrant is moving.

Of all the methods of describing rotation, Russell thinks that the simplest is that in which the direction is compared to the rotation observed in a right-handed male screw. This being clear, the direction of rotation either resembles a screw entering or coming out of an object. The next in order of simplicity seems to be the method by which the direction is denoted by the terms "clockwise" and "anti-clockwise." It is necessary, however, in this method to note the relation of the object to the face of the clock.

Pathology and Etiology of Acute Ascending Spinal Paralysis.—KREWER (*Zeitschrift f. Klin. Med.*, 1897, Band xxxii.) says that while most writers coincide in the view that Landry's paralysis is a multiple neuritis, every opportunity should be taken to study the changes in such cases. The writer reports four cases. In three of them, ending fatally, the peripheral and central nervous systems were studied microscopically. Changes were found in both. In the former a subacute degenerative neuritis; in the white substance of the cord a similar but more acute change; cloudy swelling of the cells in the gray matter, desquamation of the cells of the central canal. The vessels were distended with blood. No special changes in the cerebrum. No bacteria could be found in the sections. The author thinks that he can conclude that Landry's paralysis is nothing but the second and third stages of a chronic multiple neuritis that affects the cord by continuity. Here it spreads rapidly, generally upward, sometimes downward, causing death by involvement of the vital centres of the medulla. The outbreak usually follows an attack of some infectious disease. Clinically the progressive character of the paralysis is characteristic; the direction of its spread, however, is not. Pathologically, Landry's paralysis is a subacute chronic polyneuritis and an acute diffuse degenerative myelitis.

The Demonstration of Peptone (Albumoses) in the Urine and the Preparation of Urobilin.—SALKOWSKI (*Berl. klin. Wochenschr.*, 1897, No. 17) was struck by the fact that urobilin containing urine gave a violet color upon adding the first drops of copper sulphate of the Trommer test, and made a number of experiments to find if urobilin could give the albumose reactions. The material obtained by precipitating such urine with lead acetate and phosphomolybdic acid gave a biuret reaction and the urobilin absorption-band. The same is true of the residue obtained by shaking out in ether, making it probable that the biuret in the original comes from the urobilin. The desirability of having a preparation of urobilin for experimental purposes is evident. The method of Jaffe, modified by the use of phosphomolybdic acid, yields, the author thinks, a purer product than has yet been obtained. It differs from that obtained by the original Jaffe method in some of its physical characters, and its insolubility in ether. It gave a biuret reaction almost exactly like that of albumose.

Concerning the quantitative relations of urobilin, a 0.007 per cent. solution gives a very black absorption-band, and even a 0.003 per cent. solution a tolerably marked one. On the addition of zinc chloride to this latter solution (made alkaline) it becomes intensely rose-red, with marked green fluorescence. In a solution of this same strength made up with urine the urobilin can be shown both with the spectroscope and with zinc chloride. The stools may give an albumose reaction that is due to the content of urobilin.

The question as to whether other urinary pigments give such albumose reactions can be answered in the negative. Many urines with large urobilin content do not give the biuret reaction, probably because of the covering of the color by other pigments. Error is likely to arise only where the urine contains urobilin in quantities large enough to give a marked band in the spectrum. To detect albumose in the presence of urobilin it would seem that one had only to precipitate the urobilin with lead acetate and to test the filtrate for albumose. Unfortunately, the albumose may be carried down in the precipitate, and, if present in small amount, may escape detection. The same objection holds for such methods as decolorizing with charcoal and shaking out the acidulated urine with amyl alcohol.

As a rule, the author thinks it is best to precipitate at once with phosphomolybdic acid, because it is simpler, and small quantities of albumose are less likely to be overlooked.

A Case of Autochthonous Amœbic Dysentery.—JOSEF SARGO (*Wiener klin. Wochenschr.*, 1897, No. 18). There is no unanimity of opinion concerning the rôle of amœbæ in dysentery. Although it is not likely that dysentery will ever be proved to be a single disease, still much is to be hoped for from the new culture-methods. The various ways to account for the different forms by assuming different species of amœbæ or mixed amœbic and bacterial infections have none of them been established. The present case is of interest because of the rarity of sporadic dysentery in this latitude (Vienna) and on account of the results of inoculation.

Patient, male, aged twenty-seven years; no clear history of drinking foul water. The disease, which began with diarrhœa, followed by tenesmus and finally bloody stools, had lasted nine months when the patient first came under observation. Patient had lost weight, but had no disease in his other organs. Stools were frequent, mixed blood and mucus; they contained no pus. Amœbæ, containing vacuoles, red blood-corpuscles, and bacteria were found in large numbers. The patient recovered entirely in two months under irrigations of tannin and quinine.

The fresh stools injected into a cat caused bloody, amœba-containing stools, with temporary loss of weight. After the amœbæ disappeared from the stools, which, however, remained bloody, a second cat was inoculated from the first. This animal promptly got a bloody diarrhœa, but without loss of weight. The autopsies, four months and one and one-half months after the inoculations, showed the chief change to be in the lower part of the small intestine, where there was an enteritis, with involvement of the lymph-apparatus and swelling of the glands. There were ulcers with steep walls and much bloody, bile-stained mucus. No amœbæ. The part played by the amœbæ in the diarrhœas of the animals is not clear. The diarrhœa of the

second cat could not have been amebic. These experiments do not point strongly to an amebic cause for the dysentery of the patient. The ascending character of the disease in the small intestine may explain the intractable nature of the affection in man. In conclusion, the author suggests that heretofore a mistake has been made in killing experimental animals too early.

Chronic Diphtheria.—It is well known that diphtheria-bacilli may exist in the throat for months after an attack, and that they may occur in the healthy pharynx. Cases of chronic exudate are, however, much less common, and F. JENSEN (*Centralbl. f. innere Med.*, 1897, No. 19) reports the following: a nineteen-year-old servant-girl became ill with general symptoms and an ulcer on the right half of the soft palate, in the secretion of which virulent Loeffler's bacilli were found. During the next five months there continued to be an exudate in the pharynx in which virulent diphtheria-bacilli could always be demonstrated. The bacilli were characteristically influenced by the Behring serum, while it had no effect on the exudate. The best local results were given by a simple gargle of salt water. The blood-serum of the patient protected twenty times more than normal serum against injections of Loeffler's bacilli. The absence of symptoms of general intoxication during the greater part of the time was perhaps explained by the infiltration of the mucous membrane of the pharynx preventing absorption.

The Excretion of Uric Acid in Acute Pneumonia.—DUNIN and NOW-ACZEK (*Zeitschr. f. klin. Med.*, 1897, Bd. xxxii.). The authors review the theories that have been held concerning the origin of uric acid, and discuss at some length the process by which Horbaczewski arrives at his view that the uric acid is derived from the leucocytes and that it varies in amount with the number of leucocytes. This theory should allow of clinical demonstration. The authors began their work with the idea of proving clinically the correctness of Horbaczewski's claim. Pneumonia was chosen as affording the best opportunity, on account of the great hyperleucocytosis and the rapid absorption of the leucocyte containing exudate. Experiments were made upon five cases. In each the uric acid was estimated every day by the method of Haycroft, which has been shown to give results corresponding very nearly with those of the Salkowski method. The results show plainly that the uric acid is markedly increased during the absorption of the exudate. The uric acid began to increase the day before the crisis; the amount rose for two to four days, then fell slowly to normal in from three to four days more—a striking corroboration of the view of Horbaczewski.

Absorption from the Bladder.—MORRO and GAEBELEIN (*Zeitschr. f. klin. Med.*, Bd. xxxii.). Notwithstanding the work done on this subject, the results are contradictory, mostly due to faulty methods. Generally the experiments go to show that solutions of KI are absorbed. By inference this is true of other drugs. As regards the absorption of the normal constituents of the urine conclusions vary still more, Kaul claiming that they are and Treskin that they are not absorbed. The author's experiments were made upon dogs; the abdomen was opened and the ureters tied. The bladder was washed out and the carefully controlled solution injected. Later

the animal was killed and the fluid in the bladder again examined. The authors experimented with ten drugs, including cocaine, carbolic acid, and morphine; all except the last were absorbed. "The practical significance of the experiments is at once apparent, especially in the case of cocaine and carbolic acid. They show that in the local treatment of diseases of the bladder cocaine is only to be used with caution and carbolic acid not at all if severe poisoning is to be avoided."

SURGERY.

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A New Radical Operation for Inguinal Hernia.—Basing his departure on fifty-two operations which he has performed by Bassini's method, JONNESCO (*Cent. für Chir.*, March 27, 1897) modifies that operation in the following manner, with the purpose of obliterating not only the inguinal canal, but also the internal abdominal ring, by strengthening the abdominal wall at that point. He has performed this operation with perfect success in three cases:

The incision is the same as in Bassini's operation, commencing two finger-breadths from the pubic spine. The finger is then passed into the canal and its anterior wall divided. The hernia is reduced and the sac separated from the cord; it is much easier to isolate the hernial sac if it is first opened. The sac is ligated as high up as possible and the stump returned into the abdomen after resection.

Before the cord is replaced beneath the peritoneum it should be carefully isolated, and care should be taken to see that the entire posterior wall of the inguinal canal is divided down to the peritoneum from the internal to the external ring. The cord is now replaced upon the peritoneum and a series of interrupted sutures introduced with a curved Reverdin needle. The first tissues united are, on the one side, Poupart's ligament, and, on the other, the internal oblique and transversalis aponeuroses. These sutures extend the entire length of the canal, closing the internal abdominal ring and extending to the pubic spine, where a sufficient opening is left to allow the exit of the cord, usually an opening that will admit the tip of the little finger. The second plane of sutures unites the muscular fibres of the internal oblique and transversalis to Poupart's ligament. These stitches take in the lower

tissues as well. The third plane of sutures unite the external oblique aponeurosis to Poupart's ligament, the stitches being placed deeply into the other layers. Toward the median line, where there are no fibres of the internal oblique, there are only two layers; here the aponeurosis of the external oblique is united to Poupart's ligament, the stitches including the posterior layer. At the external ring the two pillars of the external oblique are united, the stitches including the posterior layer and an opening being left for the exit of the cord.

The entire canal is thus closed and made firm by contracting scar-tissue.

The skin suture is in two layers, the first taking in the connective-tissue layer, the second approximating the skin edges, the object being to exclude any area where suppuration could take place. An antiseptic compressing-dressing is used to prevent the formation of a hæmatoma of the scrotum.

Sixty-one Cases of Partial and Complete Excision of the Tongue.—WHEELER (*Dublin Journal of Medical Sciences*, April, 1897) says that out of sixty-one operations performed by him for malignant disease, none died from the effects of the operation, save one, a male on whom he operated by Kocher's method modified; he died of asthenia. He did not tracheotomize him.

Of the sixty-one cases, in twenty-nine the disease returned. Many of these operations were performed not with a view to cure, but merely to relieve and remove a foul, sloughing, fetid mass, and thus render existence more tolerable. Twenty-two cases he was not able to trace at all directly himself. He heard indirectly that five were healthy three or four years after operation.

Seven others had had no return of the disease, to his own personal knowledge, one to fifteen years after operation, while three had no return seven, three, and two months after operation.

There is only one prognosis for unoperated lingual carcinoma—death; and a like prognosis for a large number of operated cases. That complete recovery does take place, he believes to be undoubted, as shown by his own cases.

The kindly healing of wounds in the mouth is not due to the bactericidal action of the saliva, but to the outpouring of leucocytes which its presence in these wounds always induces.

He considers it expedient to ligate the external carotid before removing the tongue, tonsils, and part of the palate; but preliminary ligature of the lingual arteries in excision of the tongue, as recommended by Mirault, is not required; there is no hemorrhage from the ranine arteries to cause alarm, and, as the operation upon the tongue is frequently postponed until the wounds for deligating the lingual vessels heal, the disease in the mouth is increasing and may be infecting the patient. The author believes it is good surgery to remove the tongue first and then the diseased glands later, if it is necessary to do the operation in two stages.

The inflammation in the glands usually subsides a little, and the glands can then be more readily removed, and the connective tissue will be a guide to the lymphatic glands deeper in the neck, where the lymphatics directly communicate.

The author has performed all the recent operations, but prefers the thermo-

cautery scissors when suitable. It is an admirable instrument in the majority of cases of lingual cancer where the disease is not too extensive. He never uses a ligature through the tongue. The tongue is held by toothed forceps, and just as the ranine arteries are about to be severed the hot blade is allowed to cool a little, in order to allow the arteries to bleed; they are then secured and ligated. Frequent sprays are the best antiseptics.

The Resection of the Liver.—AUVRAY (*Rev. de Chir.*, 1897, No. 4) has conducted a study of the possibilities of resection of the liver in the human being on animals that leads him to conclude that the procedure is applicable, in the living, to the ablation of tumors and cysts situated in the parenchyma of the liver, so long as they are not placed too deeply in the abdomen; that is, if they, for example, are situated in the left lobe or on the costal margins.

The method consists in passing through and through the parenchyma of the liver, outside of the line of resection, two interlooped sutures, which are so arranged that the various loops formed by each include and ligate the vessels of definite portions of the parenchyma in a continuous series.

Osteoplastic Closure of Bone-cavities.—OLIER (*Rev. de Chir.*, 1897, No. 4) speaks of the great difficulty experienced in the healing of wounds and the filling in of cavities produced by the removal of diseased spongy tissues from bones, especially the long bones, and, after studying the divers phases of the question, comes to the following conclusions:

1. Cavities in bones, whether abnormal, accidental, pathological, or following operations, fill up slowly, especially when they are deep, on account of the rigidity of their walls, which do not retract. They cannot be filled by the granulations of medullary origin which form on their walls, at least when the subjects are not young and in a plastic condition. In tuberculous cases the difficulty is always very great.

2. In the long bones, as the tibia, after removal of the medullary substance, the repair is so tedious that it seems almost impossible to heal them. Of the short bones, the calcaneum is especially exposed to this slow repair where it has been reduced to but a thin wall.

3. The method to employ in healing these cavities is to remove or make movable one of the walls to permit, in the first case, the periosteum to reach the opposite wall, and, in the second, to place the osseous walls in contact.

4. When one of the bony walls is removed, the corresponding periosteum and soft tissues which cover it are pressed into the centre of the cavity and come in contact with the opposite wall. The strength of the bone is momentarily decreased by this procedure, but the formation of osseous tissue on the inner surface of the periosteum finally gives the necessary solidity. This is particularly true in cases of hypertrophy of the bone from osteomyelitis.

5. Outside of these cases, where hypertrophy has taken place it is better not to sacrifice the bone, but to form a flap which shall, according to the case, approach or be fixed to the opposite wall by metallic sutures. As soon as

the flap has been detached the cicatrization of the wound may be left to the granulations, for while they are without effect upon rigid walls, they act through the cicatricial contraction upon the movable wall. This release of one wall may be effected in many cases at the time the bone is operated upon and the cavity cleared. This precaution prevents the necessity of a secondary intervention.

6. The lateral flap is the easiest and most generally applicable. Many forms of flaps may be required, as cases differ. One may have recourse to flaps taken from other parts of the same bone or from neighboring bones, and changed by gliding or by partial torsion of the periosteal pedicle. This flap should always remain connected with the bone from which it was removed by periosteum and the soft parts, and as well nourished as possible to lessen the chances of necrosis of the flap. Where the bone is superficial the flap should be, as far as possible, osteocutaneous.

7. Bone-grafts, homoplastic or heteroplastic, may be employed, but only exceptionally, where the means to repair the loss of bone-substance cannot be found in the bone itself or any of the adjacent bones.

8. In certain cases where the cavities are intraosseous, with very thin walls in an atonic condition, it is best to proceed immediately to a resection of their entire thickness or to the total ablation of the bone, if it is a bone which is but of secondary importance to the solidity of the part.

The Cure of Tuberculous Peritonitis by Laparotomy.—A carefully conducted series of experiments for the purpose of studying the retrograde histological changes accompanying tuberculous peritonitis and laparotomy for its cure leads GARTI (*Archiv für klin. Chir.*, Band liii, Heft 4) to the following conclusions:

There are three stages observable in guinea-pigs, rabbits, and dogs—the fibrous, the pre-caseating, and the caseating—corresponding to the miliary, diffuse, and nodular forms of tuberculous peritonitis.

The operative procedure is without effect when it is undertaken too early—*i.e.*, before the tubercle has reached its complete histological development. If the operation is performed in a case of advanced disease, it may have no action upon the local disease, or, if it does, the animal may die from some other manifestation which has not been influenced by the interference.

A second laparotomy may be effective where the first is not, showing that it is often advisable to repeat the operation.

The simple laparotomy produces a bettering in the majority of cases, very frequently a macroscopic, and in a certain number of cases a histological, cure of the tuberculous peritonitis. This shows that a macroscopic, histologic, and biologic cure of tuberculous peritonitis is possible.

The histological healing takes place some months after the clinical recovery and the disappearance of macroscopic evidences. The complete healing-process extends over a period varying from six to eight months.

Fibrous tuberculosis disappears, both macro- and microscopically, after a simple laparotomy. The caseous variety is very much less influenced by operation. Often the development is slower; often retarded and made harmless. A disappearance of the caseating masses by resorption does not

take place. If there are present both forms, the fibrous will be healed while the caseating remains.

The healing of fibrous tuberculosis of the peritoneum by laparotomy is not due to an inflammatory reaction and development of connective tissue, but it is produced by a change in the epithelioid cells—a slow degeneration—which are then resorbed, while at the same time the normal cells and bacteria disappear, so that there finally remains nothing but the pre-existing connective tissue and its bloodvessels.

In caseous tuberculosis the connective-tissue capsule presents the same appearance both before and after operation, and is not thickened. The central caseous mass is thickened and may finally become entirely calcified.

The operation produces a change by which the tuberculous bacteria are killed or weakened or at least hindered from further development.

The protein of the killed or injured bacteria starts a slow degeneration of the epithelioid cells, which forms the basis of the histological degeneration of the tubercle.

The healing of tubercular peritonitis by a simple laparotomy may therefore be explained by the fact that as a result of the operation there is a fairly profuse serous exudate into the peritoneal cavity, which injures or destroys the tubercle bacilli and, under certain conditions, leads to healing through a retrograde metamorphosis.

The Technique of Suprapubic Lithotomy.—The feasibility of immediate suture after the removal of stones by the suprapubic method is discussed at length by STERLIN (*Deut. Zeitsch. für. Chir.*, Band xlv. Heft 3 u. 4), who comes to the conclusion that of cases in which this method of operating is indicated there are very few in which it is possible to secure primary union after immediate suture, and that the best method to pursue is that which he describes, as follows:

The patient is prepared by rendering the bladder so far as possible aseptic, and by two days of purgation. After narcosis the bladder is washed out repeatedly by a 3 per cent. solution of salicylic acid which is slightly warm. There should be great care exercised not to overfill the bladder and cause weakening of its muscular structure by that means. A two- to three-inch incision is made in the median line from the pubes upward, the recti muscles separated, and the left finger inserted, loosening the præ-peritoneal adipose tissue and gradually drawing the fold of perineum upward, as far as is necessary for the extraction of the stone. When possible the finger is allowed to remain while two silk sutures are inserted through the bladder-wall with a Reverdin needle and the bladder opened between them. The stone is now removed in the ordinary manner.

The next step is more difficult. He passes one or two sutures through the bladder-wall, the muscles, and the skin, thus forming a ventrofixation of the bladder. A soft catheter is now passed into the bladder, its tip cut off, a fenestrated drainage-tube passed over the tip, which is then drawn down into the neck of the bladder, while the drainage-tube is fixed by a safety-pin to the margin of the abdominal wound. There is thus secured ample drainage in both directions and a means of washing out the bladder. This washing is carried out twice daily, for the first two weeks, with the salicylic acid

solution mentioned above. The muscles, facie, and skin above the bladder-wound are united by silk sutures, and frequently from the pubes to the drainage-tube as well. The antiseptic dressing is changed twice a day at each washing out of the bladder. The patient should lie upon his side with the head of the bed raised. The fixation-sutures are removed at the end of two or three days and the drainage-tube one or two days later. The catheter remains in, on the average, one week. After its removal the patient has a bath daily, and a second retention-catheter is inserted and allowed to remain till no urine flows from the wound and the patient urinates himself. The washing out of the bladder through the catheter which is inserted late must be done with great care, in order not to rupture the union obtained in the abdomen.

The Antiseptic Value of Iodoform—The results obtained by LOMRY (*Archiv für klin. Chir.*, 1896, Band xxxv. Heft 4) in a series of experiments conducted upon animals and by bacteriological cultures in natural fluids are in marked contrast to those obtained of late by bacteriologists, and tend to prove that the clinical observation of the value of iodoform as an antiseptic is fully justified, while the experimental bacteriological investigations which have been previously made were of little value.

The results which he obtained are the following:

1. When wounds in dogs or rabbits, which have been previously infected with the staphylococcus or streptococcus pyogenes, are treated the one with iodoform and the other without, it will be seen that the iodoform exerts a beneficial influence upon the wound. It has greater vitality and a better appearance. The leucocytes are at least as numerous and more active, the amount of secretion is decreased, and cicatrization is more rapid.

2. Credit cannot be given to the bacteriologists who declare that iodoform has no antiseptic action. They have attained their results by the use of culture-media which did not dissolve the iodoform. When natural media are used for tests *in vitro* an active antiseptic action is seen.

3. Iodoform decreases the virulence of the staphylococcus and streptococcus pyogenes.

4. The iodoform neutralizes or counteracts the microbic toxins, but this neutralization or counteraction is only partial.

5. The iodoform does not hinder, even to a slight extent, the ameboid movement and phagocytic action of the white corpuscles; but, on the other hand, stimulates their ameboid movement.

Exarticulation of One-half of the Pelvis for Extensive Caries following Coxitis.—In some cases of coxitis the disease extends far beyond the area of the hip-joint before it comes to operation, and in those cases where not alone the acetabulum but the bones which go to form the innominate are involved, the only method of preventing the spread of the disease, and certain death either by phthisis or amyloid disease, is a complete resection of the bones involved. WOLFF (*Cent. für Chir.*, February 20, 1897) points this out most clearly, illustrating his subject by the report of a case in which the patient, forty five years of age, was the subject of an extensive necrosis resulting

from a tubercular coxitis. There was marked amyloid degeneration, with a large amount of albumin in the urine.

Recovery and healing could only result from a rapid and complete cessation of suppuration. The only method by which this result could be attained was a resection of the diseased half of the pelvis. Five days after the operation the albumin disappeared from the urine, and the patient made a complete recovery in a month.

In operating the steps to be pursued are the tying of the external iliac artery and the hypogastric artery, thus preventing the loss of blood in a weak patient and hemorrhage in a diseased area where hæmostasis would be profuse and extremely difficult to deal with.

The next step is a typical resection of the joint, with a final exarticulation and resection of the half of the pelvis adjoining. The use of the chisel is to be avoided, as it increases the shock; the bones should be sawn. The horizontal ramus of the pubic bone is resected at the inner border of the obturator foramen, as also the lower outer border of the ischium. The ileopsoas muscle is dissected from the inner surface of the innominate and the muscles attached to its superior border resected. The resected half of the pelvis is then disarticulated at the sacroiliac synchondrosis. The portion of the pelvis remaining is seldom diseased, and after careful curetting of the soft parts the muscles are united by buried catgut sutures in such a manner as to preclude hernia. The skin is then sutured after drainage has been secured and a compressing-dressing applied.

A New Instrument for Trephining.—DAHLGREN (*Cent. für Chir.*, 1896, No. 10) describes an ingenious instrument which he has devised, which has the essentials of simplicity and efficiency combined. After a small trephine-opening has been made and the dura mater pushed inward with a probe, it cuts a linear channel through the skull in any direction the operator may desire. It is especially adapted to the formation of the skin-periosteum bone-flap employed in Wagner's method of cranial resection.

The instrument consists of a bone-forceps whose jaws do not cross, but separate beyond the point of articulation. One arm carries a sharp hook which articulates at the extremity of the jaw and passes through between the two cutting-prongs of the other jaw. The bone is grasped and cut through by the hook while pressed against the outer surface of the other jaw. By means of a set-screw the instrument can be accurately adjusted to the thickness of the bone to be cut through.

The Treatment of Carcinoma by the Erysipelas-serum of Emmerich and Scholl.—In addition to the varied expressions of distrust that accompanied the publication of this method of treatment the following results obtained in Russia by THIELE (*Annalen der Russ. Chir.*, 1896, Heft 3) are noteworthy: (1) The complete cure by means of the serum was not observed. (2) The injections are not dangerous, but are not harmless (they produce headache, weakness, increased temperature, etc.). (3) The cancerous nodules become temporarily swollen, the growth of the tumor is checked for a time. (4) In inoperable cancers the serum can be used, as it decreases the pain and thereby the amount of narcotics required. (5) The systematic study of this method applied to early growths is much needed to demonstrate its true value.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Permanent Central Scotoma Caused by Looking at the Sun.—E. TREACHER COLLINS (London) reports the case of a woman, aged forty-nine years, who, after gazing at the sun for five or ten minutes, noticed, upon turning away, yellow disks before the eye. The yellow changed to blue in a shaded room and looking at a white surface. These disks were only faintly visible the next day and entirely gone the day after; but there seemed to be cobwebs in front of her eyes, and by the seventh day the sight in the left eye was gone. At the end of three or four weeks the right eye had entirely recovered. Six months later she was found to present normal ophthalmoscopic appearances, except that the left disk was paler than the right throughout, and its outer half markedly white; and each macula presented small shining white spots. She had full vision with the right eye, and with the left could only count fingers at three feet. The fields were of normal size, and the left presented a central scotoma, especially for red, and the field for green was almost abolished, while yellow was called white in all parts of the field, but blue could be distinguished except at the centre. The case is remarkable for the permanence of the scotoma and the occurrence of noticeable optic atrophy.—*Royal London Oph. Hosp. Rep.*, vol. xiv. p. 374.

Spontaneous Hemorrhages into the Vitreous.—PANAS (Paris) claims that infection is at the bottom of all such cases. The source of the infection may reside in a general dyscrasia like syphilis, gout, or alcoholism, and perhaps gonorrhœa, or may depend upon a local focus situated, for example, in the nasal fossa or the intestinal canal. Venous thrombosis most likely precedes the hemorrhages in many instances. This has been shown to be the mechanism in leucemic retinitis and certain ocular affections due to malaria. The prognosis is extremely unfavorable, not only as regards the affected eye, but also from the great danger of a like occurrence in the other.

Treatment should be directed to the underlying cause: disinfection of the nose, if it is diseased, abstinence from alcohol where necessary, antisyphilitic remedies when this disease is present. In the latter case, iodides are not of much service. Mercury is the sovereign drug, especially by hypodermatic injection. This remedy is indicated as a general antiseptic, even in the absence of specific disease. Arsenic is also useful.—*La Presse Médicale*, November 27, 1897.

Ophthalmia Caused by Caterpillars.—NATANSON (Moscow) calls attention to this animal as a cause of disease of the skin, mucous membranes, and eyes, either directly by contact (in a few cases), or indirectly through diffusion of its hairs giving rise to widespread epidemics. In both cases the hairs are the noxious agent through their toxic and mechanical action. The toxin is formic acid.

The ocular affection occurs under two forms—mild and severe. The epidemics are of the former variety, and run their course as bilateral conjunctivitis, lasting from one to two weeks. The severe and much rarer form is caused by direct injury of the eye by contact with the animal itself. The conjunctiva, cornea, and anterior portion of the uveal tract are the parts affected. Small nodules quite analogous to miliary tubercles and containing hairs are usually present in those structures.—*St. Petersburg, med. Wochenschrift*, xxii. No. 12.

Glaucoma after Cataract Extraction.—S. C. AYRES (Cincinnati) reports five cases (six eyes) of glaucoma following extraction of cataract. In five of these eyes extraction had been done with a liberal iridectomy; in the other eye extraction was practised after preliminary iridectomy. The first case had undergone extraction from the left eye in 1867 and the right in 1875. In 1895 the latter developed symptoms of glaucoma. The vision in the left eye had failed eight years before. In both there was contraction of the visual field, deep excavation of the disks, and vision reduced to counting fingers. The left eye showed a cystoid cicatrix at each end of the wound.

In the second case glaucoma supervened two years after the extraction, and the disk became deeply cupped and atrophied, with vision quite abolished.

In the third case, in which an upward preliminary iridectomy had been performed, and vision of 20/XL had been obtained after extraction, pain was noticed at the end of seven weeks, and some weeks later the glaucoma became acute, iridectomy downward gave no relief, and the eye was subsequently enucleated.

In the other two cases acute glaucoma developed on the sixth and twelfth days after the extraction. Both were cured by evacuation of the aqueous and the use of eserine. In one of them atropin had been used; and in the other glaucoma developed after exposure in a snowstorm.—*Archives of Ophthalmology*, vol. xxvi. No. 2.

Interstitial Keratitis in Acquired Syphilis.—TROUSSEAU (Paris) reports eleven cases of interstitial keratitis in subjects of acquired syphilis, and refers to certain points of likeness and difference between this condition and that due to hereditary lues. As with the latter, the majority (8) occurred in females; but, unlike the inherited, the acquired disease is much milder, affects only one eye, and heals much sooner and with little or no tendency to relapses. Treatment by mercury is very effective.

Trousseau attributes the milder course of the disease to the superior resisting-power of the adult tissues.—*La Presse Médicale*, 1897, No. 40.

Ophthalmoplegic Migraine.—BOUCHAUD (Paris) reviews the scanty literature of this rare disease and reports a case. The affection is characterized by

a series of periodic crises of unilateral cephalalgia, with paralysis of the third nerve of the same side; all the branches are affected, but not always to the same degree. Finally the paralysis becomes permanent.—*La Presse Médicale*, 1897, No. 34.

Glaucoma and the Curative Action of Iridectomy.—ABADIE (Paris) believes the cause of glaucoma to consist in derangement of the constrictor and dilator nerves of the sympathetic system. These form a plexus in the iris, excision of which inhibits superaction of the dilator fibres.

He bases his view upon the fact that excision of the pupillary or ciliary portion of the iris is ineffective in acute glaucoma, but the intermediate zone which contains the ganglia has to be removed if the operation is to be curative.—*La Médecine Moderne*, 8 Année, No. 38.

Sudden Loss of Vision of Circulatory Origin.—J. B. BARRETT (Melbourne) reports two cases of this affection, with a very thorough study of the literature of the subject.

His first case is that of a young medical man, who noticed, a few days before examination, that a sudden mist passed before the left eye; he was at the time standing conversing in a room. The vision failed so completely that he was unable to distinguish light from darkness; for five minutes there was complete blindness. The ceiling of the room became visible, and gradually the field cleared from above downward, until he could see all portions above the level of his own head. After a short stoppage at this point the field cleared completely, and no noticeable alteration remained. He has never had another similar attack, and was apparently in perfect health.

The second patient, a lady aged thirty-three years, noticed, while writing, that the vision of the right eye was affected, and on covering the left eye found that the right was totally blind. The blindness lasted for about fifteen minutes, and then the lower half of the field of vision gradually cleared. The upper half of the field has remained blind ever since. The defect gave a sensation of inability to raise the upper lid. The patient has suffered from shorter attacks of complete blindness—she thinks chiefly in the right eye—on about seven occasions during the last ten years. On previous occasions the blindness lasted less than one minute and left behind it no permanent affection of vision.

The eye was examined the day after the attack, and then exhibited the typical appearance of embolism of the inferior retinal artery.

From his study of recorded cases Barrett believes that spasm of the retinal arteries can cause blindness. How long the retinal circulation can be arrested without permanent destruction of vision cannot be determined, although in one case Noyes secured complete recovery by the use of nitrite of amyl, twenty-four hours after the sight was lost. The condition of the vessels when the diseased eye has been examined microscopically has been that of an embolism or a thrombosis, although in three cases out of twelve no obstruction could be discovered.

Barrett concludes that sudden temporary loss of vision may be produced by: (1) Spasm of the retinal arteries. (2) Complete embolism of the retinal artery. (3) Partial embolism of the retinal artery, probably combined with

spasm. (4) Narrowing of the retinal arteries from arterial disease and temporary heart-failure. Several of these causes may co-operate with one another.

Sudden permanent blindness may be produced by: (1) Spasm of the retinal vessels. (2) Complete embolism. (3) Partial embolism, with temporary spasm of the arteries. (4) Thrombus, with or without spasm. The conjunction of complete temporary loss of vision in both eyes, with permanent partial loss in one, seems almost to eliminate the possibility of causation of embolus.—*Intercolonial Medical Journal of Australasia*, vol. ii. No. 3.

Quinine-amaurosis without Pallor of the Optic Disks.—E. GRUENING (New York) reports two cases. The essential features of quinine-amaurosis are the sudden occurrence of deafness and blindness, the return of the function of hearing within twenty-four hours, the restoration of central vision after days, weeks, or months, permanent abolition of peripheric vision, ischemia of the retinal arteries and veins, and the absence of inflammatory changes in the interior of the eye.

Quinine-intoxication associated with transitory amaurosis, however, occurs at times in milder forms, showing a less pronounced contraction of the retinal arteries and veins and a decided fulness of the capillaries of the optic disk as a permanent condition.

One of his patients was a woman, aged fifty years, who had taken thirty grains of quinine in one dose in the evening, and awoke next morning totally blind and deaf. Hearing and sight returned; central vision and color-perception became normal in a few days, but the field of vision remained permanently contracted.

The second patient was a man, aged seventy-three years, who took 150 grains of quinine in three days and suddenly became deaf and blind. Hearing and sight returned in thirty-six hours, but the visual field remained greatly contracted.

In both cases the optic disks remained red rather than pale, and the retinal vessels were but little altered.—*New York Eye and Ear Infirmary Reports*, 1897.

Operation for Divergent Strabismus.—CHARLES BELL TAYLOR (Nottingham, Eng.) corrects divergent strabismus by the following method: He hooks up the tendon of the internal rectus muscle and divides all its connections with the eyeball, then pulls it well forward, and, by two horizontal incisions made with scissors, converts it into a narrowish strip. He then transfixes the base of this strip as far back in the orbit as possible with a large curved needle connected with a thread armed at both ends. Before drawing the thread through he cuts off as much of the tendon as may be considered necessary. With the remaining needle he pierces a small portion of the sclerotic about the site of the insertion of the inferior rectus tendon, and having thus secured control of the eyeball, turns it inward to any required extent by simply tying the thread. The only portion of the procedure which presents any difficulty is the piercing of the sclerotic. To overcome this he uses needles of the same calibre throughout, and as sharp as possible, and makes the insertion of the thread the first step of the operation.—*Medical Press and Circular*, March 10, 1897.

Cicatricial Contraction of the Orbital Tissue after Enucleation.—DR. G. C. HARLAN (Philadelphia) calls attention to a new method of dealing with this difficulty. In a case where there were a number of cicatricial bands extending from the lids to the bottom of the conjunctival sac, which obliterated the sulcus and made it absolutely impossible to wear even the smallest artificial eye, the attempt was made to form an artificial sulcus by passing a thick lead wire around the bottom of the cavity through the contracting bands, and allowing it to remain in position until the walls of the sinus it had formed had completely cicatrized or "skinned over." The patient wore the wire without inconvenience for six or eight weeks, when it was removed by incising the tissue in front of it, and a leaden shell was inserted whose edges rested in the groove where the wire had been. Later, an artificial eye was substituted for the leaden shell, and has been worn since without inconvenience.—*Ophthalmic Record*, April, 1897.

The Treatment of Lachrymal Obstruction by Styles.—R. SHALDERS MILLER (Windsor, Eng.) treats all organic strictures of the lachrymal passages by means of styles, in most cases permanently retained. Except for temporary wear, they should be made of pure platinum wire, about 25 gauge, and he makes them himself for each case. The shape, direction, and length of the nasal duct being variable, special adaptation is the key to success in the use of styles, which consist of a vertical stem, with a short arm bent at right-angles to the stem. Usually this arm is made double by recurving the wire back to the stem, so that the arm consists of two thicknesses of wire, parallel and quite close together, the recurved part lying vertically beneath the other.

The tubular styles of the instrument-makers are worse than useless; they soon become choked with mucus and dust. Also, in the case of grooved styles, the necessarily thin edges of the furrow cause irritation and the production of a granulation which stops the way. The stem of a style should not be straight, except in the case of a very short duct, but somewhat concave outward.—*British Medical Journal*, March 13, 1897.

Sympathetic Inflammation of the Eye.—E. DONALDSON (Londonderry) reports a case of sympathetic ophthalmia occurring after enucleation of the exciting eye for rupture of the sclerotic, the conjunctiva not having been ruptured. The disease continued active more than five years after its onset. The progress of the case was very variable; sometimes the eye was quiet, then again it became painful, vision grew dim, and ciliary congestion returned. The evil effect produced by catarrhal ophthalmia occurring in an eye already affected with sympathetic ophthalmia was noted. The microscope showed a plastic cyclitis in the enucleated eye. Vision equalling 4/60 still remained in the sympathizing eye.—*Ophthalmic Review*, February, 1897.

Meningitis following Excision of the Eyeball for Panophthalmitis.—C. DEVEREAUX MARSHALL (London) states that between the years 1861 and 1896 there have been 6580 eyes excised at Moorfields Hospital, among which 8 fatal cases have occurred. He reports 5 of these cases with autopsies and

microscopical examinations, and from an extended study of the subject concludes:

1. Meningitis may be present for a certain time without there being sufficient symptoms to enable one to diagnose the disease.

2. Meningitis has been known to follow other operations besides the excision of suppurating eyes, and cases are also recorded in which the excision of an eye which was not suppurating has been followed by death from meningitis.

3. The changes seen in many cases indicate that the disease is of older standing than the symptoms would appear to indicate.

4. Infection may occur at any time from an eye which is suppurating, and the longer the pus is shut up in the eye the greater is the risk and the greater will be the absorption of products of suppuration.

5. There are two ways in which meningitis may arise: (*a*) by direct extension along the optic nerve and structures passing through the sphenoidal fissure; (*b*) by infective material being carried along the vessels.

6. The sooner the pus is got rid of the better; and if it is thought not desirable to excise the eye, it should be at once opened, the contents completely removed, the sclerotic thoroughly scrubbed out, and both it and the surrounding parts rendered aseptic. Owing to there being no clear cornea to injure, a far stronger antiseptic may be employed than would be possible if a seeing eye were present.

7. As the products of putrefaction may have soaked into the sclerotic and infected the surrounding parts, it is far better to remove it; good drainage is then insured, and every piece of useless and suppurating tissue is removed.
—*Royal Lond. Ophthal. Hosp. Rep.*, vol. xiv. p 305.

DERMATOLOGY.

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On Ringworm: an Inquiry into the Plurality of its Fungi.—T. COLCOTT FOX and FRANK R. BLAXALL have collected and published in brochure-form (London, 1897, pp. 65) their valuable papers which have appeared in the *British Journal of Dermatology* during the past year. The subject is one of great interest, especially since the elaborate and scientific investigations of Sabouraud in Paris. Fox and Blaxall's conclusions, based upon a clinical, microscopical, and cultural investigation of more than 400 consecutive cases of ringworm of the scalp, of the beard, and of the glabrous skin, cor-

respond generally with those reached by Sabouraud. They can distinguish clinically, microscopically, and by cultures the group separated by Gruby and Sabouraud and associated with the growth of *microspora*; also another group associated with the growth of *trichophyta*. The last group is divisible into two secondary groups, denominated *endothrix trichophyta* and *ectothrix* or *endoectothrix trichophyta*. In London the *microspora* are probably the cause of 80 to 90 per cent. of cases of ringworm of the scalp; the *endothrix*, of nearly 4 per cent.; and the *ectothrix* or *endoectothrix*, of the remainder. The cases of beard-ringworm appear to belong to the last group, and the majority of cases of ringworm of glabrous skin, exclusive of those associated with lesions of the scalp, are caused by *trichophyta*. Fox and Blaxall have not met with an example corresponding to the "peladoid" (or alopecia areata) form described by Sabouraud. It may be well to state that Sabouraud holds that in Paris the ringworms which he met with in human beings comprised two affections caused by fungi as distinct from one another, clinically, morphologically, culturally, and botanically, as those of *tinea versicolor* or *tinea favosa*, from either of them. The more frequent one is ringworm with small spores, the special fungus described by Gruby, in 1843, under the name of *microsporon Audouinii*. The other affection comprises the ringworms with comparatively large spores, the true *trichophytosis* of all sites, caused by various species of *trichophyton* fungus, belonging to a family distinct from the *microsporon*. These *trichophytoses* are divisible into two great groups, the one apparently of exclusively human origin, characterized by a marked tendency to affect only the interior of the hair when that structure is invaded, and hence denominated *trichophyton megalosporon endothrix*; the other apparently of animal origin, and locating itself chiefly between the wall of the follicle and the hair as well as entering the shaft, and hence called *trichophyton megalosporon ectothrix* or *endoectothrix*. The *endothrix* fungus causes about 35 to 40 per cent. of all scalp-ringworm in Paris and about 72 per cent. of the scalp-ringworms with large spores. The authors call attention to the fact that ringworm fungi (also the fungi of *tinea favosa*) have a very unequal distribution in European countries. A lesson is to be learned from the admirable work done by Sabouraud, Bécclère, the authors, and others in ringworm, and that is, that one should be cautious in criticising the results obtained by observers in different countries. Numerous photomicrographs accompany the article.

The Etiology of Trichorrhesis Nodosa —BRUHNS (*Archiv für Dermatologie und Syphilis*, Bd. xxxviii, Heft 1), who has studied trichorrhesis nodosa as it occurs in Berne, concludes a paper on this subject as follows: trichorrhesis nodosa capilitii is very frequently observed in women in Berne and vicinity. The bacterial investigations of the disease and the inoculations undertaken therewith have not proved that it is produced by a specific bacterium. The author failed to find a bacterium as the cause in six cases investigated by him with this end in view; and inoculation upon the hairs of other individuals failed to produce any result. On the contrary, some facts are very much against a bacterial etiology—as the occurrence of trichorrhesis periodically in connection with attacks of epilepsy, as reported by Rauber. On the other hand, it is improbable that it varies only through mechanical causes;

there must be some predisposition to the affection, brought about probably by disturbance of nutrition.

Myoma Multiplex of the Skin.—CROCKER reports (*British Journal of Dermatology*, January and February, 1897) an example of this rare affection, it being the eleventh recorded case. The patient was a man, forty-three years of age. Eighteen years before coming under the reporter's observation a single tumor appeared on the lower jaw of the left side. Two years later another appeared about one inch from the first one; and since that time new ones gradually appeared until they formed a patch about an inch by an inch and a half in area, containing twenty-seven tumors varying in size from a hemp-seed to a large bean. They were brownish-red in color, firm to the touch, and entirely painless. The treatment consisted in the excision of the entire patch.

The author presents likewise an abstract of all the cases hitherto reported. From an analysis of these it appears that in seven the affection occurred in females; in four in males. The age at which the disease first made its appearance varied from infancy to sixty years; the size of the tumors varied from a millet-seed to a hazelnut; the number was very variable, and while in some cases they occurred singly, in most there was a marked tendency to form groups. The color was brownish-red or some shade of red, and the skin over the tumors was always normal. A microscopical examination of the author's case showed that the epidermis was unaffected, the growth being seated for the most part in the deep part of the corium, leaving the papillary body free in some sections, but going up to the papillæ in others. The small tumors were seen to be situated about the hair-follicle, the follicle being surrounded with a thick layer of smooth muscular fibres. These could also be seen in some sections about the sebaceous and sweat-follicles. Bloodvessels were not numerous, but where present showed evident thickening of the muscular coat.

OBSTETRICS.

UNDER THE CHARGE OF

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Shock in Obstetric Surgery.—In the *American Gynecological and Obstetrical Journal*, April, 1897, COE, of New York, contributes an interesting paper upon this topic. He cites six cases in which delivery by forceps and embryotomy was followed by shock which in four cases proved fatal. He adds a case of ruptured uterus in which the rupture was not detected at labor, in which the patient died after abdominal section. He also describes

a case of a patient who had aborted and suffered from severe shock after curetting. His list of cases closes with that of a patient who perished from shock accompanied by rapidly developed pulmonary œdema.

Coe has observed that this complication is most apt to occur in fat, neurotic women often in comfortable circumstances, and sometimes accustomed to luxury. Old primipare are especially exposed to this danger.

[The reviewer is in full accord with Dr. Coe in the warning which he expresses in this paper. No medical man is burdened with so heavy a responsibility or obliged to work in such unfavorable conditions as the obstetrician. All who practise obstetrics should unite in educating the community to acknowledge the fact that a difficult labor requires the care and assistance which are invariably employed in conducting abdominal sections. Unless such precautions be taken, the mortality-rate of difficult confinements in private houses must always remain a very high one.]

The Treatment of Fibroid Tumors Complicating Pregnancy and Labor.

—At a recent meeting of the Obstetrical Society of France (*Gazette Hebdomadaire*, 1897, No. 34) KEIFFER read an extended paper upon this subject, in which he drew the following conclusions: hysterectomy in fibroid uteri in pregnant patients is demanded for four indications: (1) when, independently of pregnancy, the fibroid tumor would make hysterectomy justifiable; (2) when the fibroid occupies such a position that labor would be impossible; (3) when the tumor is degenerating, or suppurating, and when a retained placenta complicates the case; (4) hysterectomy should be performed in a case of labor complicated by fibroid tumor of the uterus after the child has been extracted by Cæsarean section.

Habitual Abortion.—CHARPENTIER contributed a paper upon this subject at the recent meeting of the Obstetrical Society of France (*Gazette Hebdomadaire*, No. 34, 1897), in which he stated that four classes of patients are especially liable to repeated abortion. The first of these have some malformation of the uterus which prevents its normal development during pregnancy. Frequent contractions of the womb follow conception, and abortion finally occurs about the second or third month. A second class is composed of those women in whom the womb is abnormally displaced. They sometimes go to five or five and a half months. A third class of patients exhibits intense congestion about the neck and body of the uterus during pregnancy. These women sometimes bleed during pregnancy at the usual time for menstruation. Others suffer greatly from hemorrhoids. A fourth class especially liable to abortion are those in whom a tumor of the uterus, either in the neck or body, is present; such are cases of fibroid tumor or sarcoma. It is evident that the treatment of these patients should be addressed to remedying the existing condition which causes the abortion.

The Temperature of Breast-milk.—SMESTER, in the *Maladies de l'Enfance*, 1897, No. 15, has made experiments upon the temperature of milk as it is taken from the breast of the mother. He used a form of breast-pump containing a thermometer, so that the temperature of milk could be measured without admitting the external air. He finds that as the milk enters

the child's mouth its temperature is always below 98° F. It usually varies from 96.5° to 97° F. It is evident that milk given to children should not be heated above these temperatures, and Smiester claims that infants naturally decline milk warmed to any degree.

Investigation into the Percentage of Hæmoglobin and the Number of Red and White Corpuscles during Pregnancy and the Puerperal State.—In the *Archiv für Gynäkologie*, Band liii, Heft 2, WILD gives the results of his observations upon this subject in the clinic at Zurich. He finds that during the last weeks of pregnancy there is a slight increase in hæmoglobin in the blood of the mother, with a slight decrease in the number of red blood-cells and a striking increase in the number of white cells. During labor the hæmoglobin and red cells are diminished through loss of blood. During the puerperal period the patient gains in hæmoglobin and red blood-cells. The white cells are most abundant immediately after labor and diminish somewhat during the puerperal state. Lactation exercises a favorable influence.

The Presence of Bacteria in the Milk of Nursing-mothers, and its Relation to Mastitis.—In the *Archiv für Gynäkologie*, 1897, Band liii, Heft 2, KÖSTLIN reports the result of a series of investigations in the clinic at Halle on this subject. He finds that in the majority of cases the secretions of the breast in pregnant and puerperal women and even in the newborn contain bacteria. In pregnant women this was true in 86 per cent. of patients examined, in puerperal women in 91 per cent., and in newborn infants in 75 per cent. With very few exceptions these germs were staphylococci, and especially the *staphylococcus albus*. In these cases no point of entry for these germs was found nor any circumstances explaining their presence. They must have entered from without through the nipples, and especially from the areola about the nipples. It has not yet been possible to recognize them in the blood-current. The presence of these germs was harmless to mother and child. The view formerly held, that mastitis depends upon micro-organisms, is still correct. The infection in mastitis comes from without, through a lesion in the skin communicating with the lymph-channels, and spreads itself in different ways in the case of different germs. The ordinary form of mastitis results from invasion of staphylococci, especially the *staphylococcus aureus*. The less common forms of mastitis, such as pseudo-erysipelas and retromammary abscess, are caused by streptococci. All means of study of these cases point to common conclusions; mixed infections are possible, and not uncommon; a mastitis caused by metastatic infection through the blood-current has not as yet been clearly proved.

Extravasation of Blood in the Vertebral Canal in Newborn Infants.—In the *Archiv für Gynäkologie*, 1897, Band liii, Heft 2, SCHAEFFER reports some very interesting studies upon this subject made in the Heidelberg clinic. He finds that in 100 autopsies upon newborn infants that in one in every ten extravasated blood was found in the vertebral canal, while cerebral extravasations were as frequent as two in every ten. In seventeen cases of vertebral bleeding 41 per cent. followed the use of forceps or extraction in

breech presentation. Some of the children perished during birth; others at varying periods afterward; 24 per cent. of these had other birth-lesions; these were principally lacerations or injuries of the cerebral mass. In the whole number of children dying, 64 per cent. died of birth-injury; 29 per cent. perished of disease or injury resulting indirectly from birth.

It was observed that prematurely born children most often sustain birth-injury, while those born at term develop post-partum diseases. So far as regions of the spine were concerned, in which bleeding was most frequent, in three cases extravasation occurred in the medulla; in two cases in the cervical region; in three cases in the cervical and dorsal; and in two in the dorsal and lumbar. These were all in children who had been extracted in breech presentation. So far as prognosis is concerned, when bleeding occurred into the region of the medulla the child died. The result depended, of course, somewhat upon the amount of hemorrhage, although that did not seem a deciding factor. In asphyxiated children and in premature children any strong mechanical excitement, such as extraction, and above all Schultze's manipulation, can cause such hemorrhage. The prevention of this complication consists in warding off all infection during and after labor and in using those methods of delivery which offer least violence to the fetus. It is especially noticeable that the cautious application of forceps gave excellent results.

GYNECOLOGY.

UNDER THE CHARGE OF

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OF NEW YORK.

Renewal of the Endometrium after Cauterization.—JUNG (*Centralblatt für Gynäkologie*, 1897, No. 18) contributes an interesting paper on this subject, based on microscopical studies of a uterus removed four months after thorough cauterization of its interior. The operation was performed for obstinate hemorrhage, which had not been controlled by curettement and application of chloride of zinc paste. An entire cast of the uterine cavity had been passed. On examination of the endometrium it was found that renewal of the epithelial layer had begun, though only over a small region. The new mucosa was in the same hyperplastic condition as before the cauterization. This proves that the endometrium "is a tissue possessing an inexhaustible power of regeneration," no matter how thoroughly it may be destroyed. Microscopical investigations by Werth show that young connective tissue is renewed within a few days after the traumatism from similar tissue in the muscularis. The former is only temporary, being replaced as early as the tenth day by normal stroma. The glands redevelop from remnants of pre-existing glands, the superficial epithelium from that lining the mouths of the newly formed glands. The growth of the new vessels keeps

pace with that of the regenerated mucosa, being complete even on the fifth day.

Bossi's conclusions were somewhat different. He removed the endometrium and a portion of the muscularis from the uteri of dogs, and found that regeneration was complete in three months. He observed that the glands developed from remains of old glands only at the border of the raw surface; in the centre of the wound the glands were formed by ingrowth of the new surface-epithelium into the subjacent connective tissue. The writer finds the conditions in his own specimen similar to those caused by experimental traumatism in Bossi's cases; the results were different, since after the cauterization regeneration was only partial, and the mucosa was renewed in six weeks, as shown by a return of the hemorrhages.

The writer concludes that the use of chloride of zinc within the uterine cavity for the relief of hemorrhage, in paste or strong solutions, is reprehensible. Although the destructive character of the escharotic is marked, it is uneven and cannot be controlled, while there is great danger of producing stenosis. The application should not be repeated within less than two weeks, in order that the raw surface may have time to heal. The use of a 50 per cent. solution, applied on cotton, is preferable to pencils or intra-uterine injections.

Conception after Curettement of the Cancerous Cervix.—LEINZINGER (*Ibid.*) reports a case of this character, in which a patient was admitted to the hospital with inoperable carcinoma of the cervix. She was curetted on November 26, 1895, and was discharged improved. She remained well for ten months, when the operation was repeated, November 17, 1896; she became septic, and was again curetted; aborted with a four and a half months' foetus, and died eleven days later. The writer emphasizes the following points: 1. The relief afforded by the curettement, extending over nearly a year. 2. The occurrence of pregnancy, which seemed to have no unfavorable effect upon the development of the disease. 3. The absence of all symptoms which would awaken the suspicion of existing pregnancy. (The enlargement of the uterus was supposed to be due to hydrometra.) 4. The profuse hemorrhage attending the third operation undoubtedly hastened the fatal termination. [We have been personally cognizant of several cases in which abortion followed curettement for advanced carcinoma of the cervix, pregnancy being unsuspected; in one instance of recurrence after high amputation we succeeded in carrying the woman to full term and a successful delivery, and were afterward able to extirpate the uterus, the patient being still in good health four years after the operation.—H. C. C.]

Vaginal Hysterectomy with the Use of Clamps.—AREND (*Ibid.*) repeats the usual arguments in favor of clamps *versus* ligatures. He claims that the pain caused by the former is not greater than when ligatures are used, and that the danger of hemorrhage is much less, though he always removes the instruments at the end of forty-eight hours, the gauze being entirely withdrawn on the fifth or sixth day.

[Too little stress is laid upon the extensive sloughing-process which attends the use of clamps, and requires most careful after-treatment to insure a rapid

and afebrile convalescence. The writer's experience is too limited to allow of *ex cathedra* statements.—H. C. C.]

Massage in Trendelenburg's Posture.—BENTNER (*Centralblatt für Gynäkologie*, 1897, No. 19) recommends this posture for the following reasons: 1. The oblique abdominal muscles are more relaxed. 2. The intestines fall toward the diaphragm, so that massage is easier in fat subjects. 3. Women feel less weary after manipulations in this posture. 4. The uterus and adherent adnexa are carried upward *en masse*, becoming more accessible to the external hand. The writer found that patients who had tried massage in both the dorsal and elevated postures preferred the latter.

Constipation in the Female.—PINCUS (*Archiv für Gynäkologie*, Band liii. Heft 3) has made an exhaustive study of the causes of chronic constipation in the female, which he believes is due not only to loss of tone in the muscular layer of the intestine, but to weakening of the abdominal and levatores ani muscles. In the treatment of this condition he relies upon massage, electricity, and gymnastic exercises, to the exclusion of laxatives and enemata. After a "preparation" of from one to six weeks, during which time the bowels are thoroughly emptied by high enemata, he affirms that the most obstinate case of constipation can be cured in from three to nine days. Abdominal massage must be practised in a scientific manner, hence only by a physician. A good substitute for massage is the systematic use for ten minutes, morning and evening, of a bag filled with stones or bits of iron, which is rolled about over the abdomen. Many interesting details are given.

Cancerous Degeneration of Dermoid Cysts.—THUMM (*Ibid.*) reports a case of epithelioma developing on the inner lining of an ovarian dermoid. He has no explanation to offer with regard to the etiology. Malignant degeneration of dermoid may occur at any age, but is always unilateral. Metastases are local, ascites is rare.

The diagnosis is difficult. Unusually rapid growth of a dermoid, associated with progressive emaciation, ascites, and cachexia, might cause the suspicion that malignant degeneration had occurred.

The prognosis will depend upon the stage at which the tumor is removed. In the case reported, in which the disease was advanced, an early recurrence took place, and the patient died six months after the operation.

Hemorrhagic Endometritis in Virgins.—BLANC (*Loire médicale*, December 15, 1896) calls attention to the fact that, although menorrhagia in virgins has often been observed, the treatment has been usually simply medicinal, and therefore not curative. He recommends curettement as in cases of ordinary hyperplastic endometritis in married women. The following cases are cited:

Case I.—Girl, aged sixteen years, with menorrhagia of eighteen months' standing, beginning with her second menstrual period. So much blood was lost that death became imminent. Curettement was followed by relief for six months, when a second operation was necessary. There was no return of the hemorrhages after the lapse of six years.

Case II.—Menorrhagia of a year's standing in a girl, fifteen years of age,

with pelvic pains and marked anæmia. The curette removed a quantity of pale fungosities; the patient was cured.

Case III.—Hemorrhages recurring at intervals for six months in a child of fourteen. Cure by curettement.

Case IV.—Obstinate hemorrhages in a patient, aged fifteen years, which had continued for six months in spite of the administration of iron, ergot, hydrastis, and hot douches. An operation was refused and the patient eventually succumbed.

Congenital Prolapse of the Uterus—BALLANTYNE and THOMSON (*American Journal of Obstetrics*, 1897, No. 2) report two cases, making eight which have been published. They call attention to the importance of distinguishing true prolapse from hypertrophic elongation of the cervix, although the two conditions may coexist. Congenital prolapse is commonly associated with spina bifida, prolapse of the rectum, and sometimes flat-foot. These infants usually die soon after birth, probably from causes attributable to the presence of the spina bifida. The prolapse may be partial or complete, but rarely gives rise to symptoms. The etiology is usually to be sought for in faulty innervation due to the spina bifida; but increase of the normal abdominal pressure, unusual size of the pelvis, and hypertrophy of the cervix or corpus uteri are doubtless contributing factors.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF

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Soaps as Disinfectants.—Much experimental work has been done within the past fifteen years to determine the place which soaps should occupy as disinfectants. In 1881 Koch showed that potash soap, 1 : 5000, would materially diminish the growth of anthrax-bacilli, and 1 : 1000 would prevent it completely; and that potash soap was eight times as powerful as potash itself. In 1885 Kuisl asserted that while it acted on anthrax, it was quite inert against other kinds of bacteria. Thus, typhoid bacilli would thrive in the presence of 2 per cent. of soft soap, as would also the spirillum of cholera. In 1890 Behring experimented with forty different soaps, and concluded that their disinfectant power was dependent on their alkalinity. In 1893 Nijland, experimenting with a soft soap containing 42.7 per cent. water, a medicated soap containing 7.3 per cent., and a hard washing-soap containing 14.5 per cent., found that when used in 0.24 per cent. solution the first would kill

cholera germs in ten minutes, the second in fifteen, and the third not completely in fifteen, but in 0.30 per cent. solution within one minute. Jolles, in 1893, tried five soaps, and proved them to be powerful agents; and in 1895, experimenting with another soap, which was almost neutral in reaction, containing but 0.041 per cent. free alkali, found that typhoid bouillon was sterilized by 1 per cent. within twelve hours, by 3 per cent. within two hours, and by 6 per cent. within fifteen minutes, at 4° to 8° Centigrade. At 18° C. the action was weaker. Practically the same results were obtained with other bacteria.

DR. RICHARD REITHOFFER (*Archiv für Hygiene*, xxvii. II. 4), who quotes the above-mentioned authors, has given the results of new experiments conducted by himself. He tried (1) a common soft soap containing 39 per cent. water and traces of free alcohol; (2) a white almond soap perfumed with nitrobenzol, containing 34.3 per cent. of water and 0.062 per cent. free alkali; and (3) a solid patent potash soap containing 8.4 to 13.8 per cent. water and 0.031 free alkali. The last mentioned, in 1 or 2 per cent. solution, was effective to kill infectious material in bouillon, but 0.2 and 0.5 per cent. did not suffice. Ten per cent. solution killed cholera and other cultures in distilled water in half a minute, and in half and quarter the strength the same result was achieved not so quickly, but in a very short time. All three of the soaps proved to be highly effective in even 1 per cent. solution. Cholera-growths were killed by this strength in from a half to one minute, but the Massaua vibrio required from three to five minutes, whichever of the three soaps was used. In $\frac{1}{2}$ per cent. solution the patent soap killed cholera in five minutes, but the Massaua vibrio at the end of a half-hour was not completely destroyed. The soft soaps proved to be less active, but the almond soap killed all within three to five minutes. From his experiments he concludes that for washing body- and bed-linen, clothing, wooden and iron furniture, so that cholera-germs shall be completely destroyed within five to ten minutes, 4 to 5 per cent. soap solution is probably efficient under all conditions. He points out, however, that one must be careful about soft soaps, the common article of the shops being often unclean and inferior, and suggests the possibility that Knisl used such in his work.

Further experiments with typhoid bacilli and bacterium coli proved that here, again, the soaps have a high disinfecting-power, and under conditions when other means are not at hand in typhoid they may be used for practical disinfection. But much higher strength must be used than against cholera, and the disinfection of the hands requires very careful washing and plenty of soap. Under favorable conditions it requires 10 per cent. solution of soap to kill typhoid bacilli within a minute. Five per cent. solution requires from three to ten minutes, according to the sort of soap; thus, almond soap three minutes; soft soap, ten minutes. Of the three soaps, the patent potash soap alone seemed to act as strongly against the bacterium coli as against the typhoid bacillus. Unfortunately, the soaps fail utterly, or at least so far as practical disinfection is concerned, against pus cocci. Staphylococcus pyogenes aureus will remain unchanged an hour or more in 18 to 20 per cent. soap solution; hence in surgical practice soaps alone cannot be regarded as efficient.

In the experiments against the bacillus typhosus and bacterium coli the

almond soap proved to be much the most powerful of the three, and the results suggested that nitrobenzol, with which it was perfumed, might have some disinfectant power. Nitrobenzol is almost insoluble in water, but readily soluble in soap solution. Experiment showed that soap solution was made more powerfully disinfectant when $\frac{1}{2}$ per cent. nitrobenzol was added.

Another soap, a "potash cream soap," containing 40 per cent. lysol, was tried against typhoid, bacterium coli, and staphylococci, and proved to be no more powerful than the other soaps excepting against the staphylococci; but here again it proved much weaker than a solution of lysol alone of the same lysol strength. Experiments with carbolic soap showed that carbolic acid also is weakened by the presence of the soap. Thus it appears that the addition of disinfectants to soap is not always advantageous, and that the old way of first washing the hands with soap and then afterward treating with disinfectants is the better one.

A New Process for Producing Sterile Drinking-water.—STAESARZT DR. SCHUMBURG (*Deutsche medicinische Wochenschrift*, March 4, 1897) recommends a new process devised by himself for the quick sterilization of water. It is one which in five minutes kills nearly all water-bacteria and all pathogenic bacteria found in water. The agent used is bromine-water, which, in its turn, after five minutes, is made harmless by means of ammonia, and a clear, tasteless, sterile water is the result. The amount of bromine necessary is very small—only six centigrammes per litre. He uses a solution of twenty parts each of bromine and potassic bromide in one hundred of water, and of this solution 0.20 c.cm. proves to be enough to sterilize a litre of Spree water in five minutes. Very hard waters and grossly polluted river- and marsh-waters require larger amounts, on account of the lime-salts in the former and ammonia in the latter uniting with a part of the bromine before it has an opportunity to exert its disinfectant power. With such waters it is necessary to add the solution until a faint yellow color is produced and persists at least a half minute.

To do away with the bromine of 0.20 c.cm. of the solution an equal volume of 9 per cent. ammonia is enough; and thus, whatever the volume of the bromine solution used, a corresponding volume of 9 per cent. ammonia is necessary.

After treatment the water has practically no taste and is absolutely clear, while the resulting bromine compounds amount to so little as to merit no notice. The method was proved with all sorts of pathogenic organisms, and is recommended particularly for troops in quarters or bivouac, for sterilizing water in the tropics, especially on expeditions, and filling ships' water-tanks, for individual use during the prevalence of epidemics, for the quick preparation of aseptic water for the practising physician, etc. With a kilogramme of bromine (costing in Germany from five to six marks) one can sterilize sixteen thousand litres of water.

Formaldehyd as a Practical Disinfectant.—The fact that the Tollens, Gambier, Trillat, and Krell lamps for generating formaldehyd are not capable of easily producing it in sufficiently large amount for practical use led PROF.

F. C. ROBINSON (*Journal of the American Public Health Association*, October, 1896) to experiment with the view to devise a lamp which might be free from their defects, and thus come into general use for disinfecting-purposes. His lamp consists of a disk of moderately thick asbestos-board perforated with small holes close together and platinized with a strong solution of platinic chloride, and a lamp-font, which is a shallow, cylindrical dish of such size that the disk will just cover the top. This font is partly filled with methyl alcohol. The disk is wetted with the alcohol and removed from the dish, and then the alcohol is ignited. By the time the alcohol burns away the disk is sufficiently heated so that when placed over the lamp-font again it will continue hot and change the alcohol to the aldehyd most efficiently. The amount of alcohol converted in a given time depends on the size of the disk; with one of six inches diameter a litre can be converted in an hour.

By way of testing the efficacy of the agent as a disinfectant, Robinson experimented with typhoid- and diphtheria-cultures in a room of three thousand cubic feet capacity, with three large windows with loose sashes. One litre of methyl alcohol was used and the room was closed for four hours. This was found to be insufficient for complete sterilization of infectious material which was covered or concealed to any great extent. But with one and a half litres and three and a half hours' exposure complete sterilization was effected. That the substance has remarkable power of penetration was proved by the fact that all parts of clothing, including seams and inside of pockets, were sterilized in all parts of the room, and typhoid-cultures were destroyed, although covered with a layer of sand a half-inch deep. When two litres of the alcohol were used and exposure continued seven hours, cultures of typhoid and diphtheria placed beneath bedclothes, under the pillows, within the mattress, and even rolled up in a mattress and the whole tied into as compact a bundle as possible, were found to be completely sterilized. From his observations Robinson is of the opinion that at least a quart of alcohol should be used in disinfecting an ordinary living-room; this amount will yield about thirty-six volumes of the aldehyd gas, which, as such, or in solution, is practically without injurious effect on metals, wood, cloth, and most colors.

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THE INDICATIONS FOR AND THE TECHNIQUE OF
HYSTERECTOMY.

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THE INDICATIONS FOR HYSTERECTOMY. When should the uterus be removed?

1. In intractable, often-recurring hemorrhage without discovered fibroid or malignant disease, when all the usual remedies have been tried and curetting has been done every few weeks without permanent success. Clinical reasons prevail over histological, and practical over theoretical.

2. In all kinds of malignant disease, when the operation is possible without permanent injury to the bladder or bowels. Even if there is little hope of cure, the hemorrhage may be stopped, and there is less subsequent pain and discomfort than when the disease is left to run its natural course.

3. (*a*) In a case of fibroid tumor which causes much discomfort or (*b*) threatens death by hemorrhage (and it does sometimes not only threaten, but causes it as suddenly as a pulmonary hemorrhage does). (*c*) Because it may increase and become too burdensome to allow life to be worth living. (*d*) Because it may develop a cancerous character. (*e*) Because by its pressure on the abdominal organs it may destroy life. (*f*) Because it may become cystic and thoroughly adherent. I do not mean fibroids with dilated lymph-spaces, but fibroids with cysts as clear and distinct as those in ovarian tumors. (*g*) Because it may be an ever-present anxiety. (*h*) Because it may cause œdema of one

or both extremities and phlebitis, to be followed, perhaps, by the passage of an embolus into the circulation, causing death by cardiac, renal, pulmonary, or hepatic disease. (i) Because it may become twisted with the uterus as a pedicle, and must be removed immediately to save life; I have seen this once. (j) Because a very sensitive single woman, in good health and active, demands its removal on account of the disfigurement it causes. (k) Because the operation, today, in experienced hands, is almost uniformly successful.

4. In cases of uncontrollable complete prolapse, particularly after the menopause, when pessaries and all the usual operations for holding up the uterus have been tried and found useless.

5. In cases of incurable chronic inversion.

6. In cases of infection when the removal of the Fallopian tubes affected with salpingitis has not cured the patient.

The French surgeons of the present day have a great deal of right on their side when they claim that the uterus is the infecting organ, and that in many cases there will be no cure until it is removed.

It has seemed to me that the removal of non-adherent tubes, no matter how large or how chronic, has cured the patient. In few of the cases, however, where I have (as the expression is) "dug out" adherent tubes and ovaries have the patients been cured of their backaches and nervous symptoms, though most of them have gained in weight and appearance.

7. To cure puerperal sepsis where the diagnosis is as certain as it can be.¹

The two following cases are examples of the first class enumerated as proper ones for hysterectomy. The first was one of chronic hyperplastic endometritis. The other was one where an undiscovered fibroid existed in the right cornu and gave rise, from time to time, to severe hemorrhage.

CASE I.—I saw, in the latter part of January, 1894, with Drs. Morrill, Wyman, and Prof. W. L. Richardson, a married woman, aged thirty-eight years, the mother of five children. Severe flowing, becoming constant, had begun in November, 1893, and had continued until I curetted on January 30, 1894. I removed several ounces of hyperplastic material, which I gave to Dr. W. F. Whitney, Pathologist of the Massachusetts General Hospital and Curator of the Warren Museum. His report is as follows: "Microscopical examination showed the structure to be made up of large tubular glands, in places more or less dilated, and with fatty-degenerated epithelial cells. The interglandular substance was of a small, round, and spindle-celled type, and well vascularized. There were no muscular fibres found. The diagnosis is hyperplastic endometritis, with some fatty degeneration of the glands. I could find no evidence of true cancer or malignant adenoma." After

¹ See report of case by Dr. C. B. Penrose, in *The American Journal of Obstetrics*, May, 1896.

ten days the flowing ceased, and then began again a fortnight later and continued, so that in April it was necessary to curette again. This manœuvre once more stopped the flowing for a time; but by the middle of May it recurred freely. From the time of the first curetting the patient had been taking iron and tonics, and had gained considerably in strength and color. During the summer there was more or less hemorrhage, and on September 2d I curetted again, and as usual painted the interior of the uterus with pure carbolic acid and with tincture of iodine. Flowing began in October, and on November 2d I received a letter from which I will make an extract:

"I asked my husband to see you yesterday because this miserable leakage has continued daily and is now increasing so that I feel it more, and it is almost as much as I can do to keep up my spirits and courage to fight it out. When I was told that all you could advise further was to curette and cauterize again, and try electricity, and then perhaps curette again, I was highly discouraged, for the curetting which saved me last winter seems now to have but little effect. I have faithfully tried to get well and have failed."

The result of the last curetting was sent to Dr. Mallory, who had taken Dr. Whitney's place, and his report is in part as follows:

"Uterine glands flattened, twisted, or bent, or dilated into small cysts containing desquamated cells, a few leucocytes, and about the normal amount of glandular tissue. Mitosis is fairly abundant. No formation of atypical glands or invasion of muscular tissue. Chronic proliferating endometritis."

The patient was much discouraged, and I could not suggest any measure that would certainly cure her except hysterectomy. She decided calmly and at once to have the operation done, and on November 10, 1894, I did vaginal hysterectomy by the method to be described, securing the vessels with clamps and ligatures, the ligatures being necessary because the ovaries fell down into the vagina and I thought it was best to remove them—in fact, one of them was cystic. Dr. Whitney examined the uterus and reported as follows:

"The uterus measured 12 cm. in length, with a cavity of 10 cm. in depth, the walls of the fundus being 2 cm. thick. The uterus was also dilated; the mucous membrane was thickened and shreddy and infiltrated with blood. Microscopical examination showed large masses of tubular glands, with but relatively little interglandular substance. The basis was quite sharply defined, but here and there was extension distinctly into the muscular substance. The diagnosis is of a glandular form of hyperplastic endometritis." Recovery was rapid. There has been no more hemorrhage nor despondency. The patient has gained twenty pounds in weight and is the picture of health and has never regretted that she decided to have the uterus removed.

CASE II.—This case is interesting on account of its international character, and because of the difficulty of diagnosis. A lady, aged sixty-three years, the mother of three children, of whom the youngest was thirty-six years old, had uterine hemorrhage in Paris in April, 1892, and again in London in May. The London surgeon in attendance summoned a distinguished physician, and they pronounced the case one of cancer and likely to run a very rapid course. The diagnosis made by these gentlemen was based on the following conditions (as stated in a letter to the husband of the patient): "Has had hemorrhage. The

uterus was enlarged. The passage of the sound caused profuse bleeding. These symptoms, together with her age and history, pointed to malignant disease. The inadvisability of an operation was based upon opinion arrived at after our examination, when the disease had already reached the stage at which any attempt to extirpate the enlarged womb would not only entail a very great risk of life, but would, moreover, fail to entirely eradicate the disease." In ninety cases out of one hundred these facts would have been sufficient to base the diagnosis of cancer upon, but as the sequel will show they were in this case fallacious. The lady sailed immediately for home. Both she and her husband were in a very depressed state. I saw her at Newport on August 5th, with Drs. Lusk and Cleveland. We etherized her, and found the uterus normal in size and surroundings and the patient healthy and well-nourished, with a normal complexion. We found no sign of cancer, and expressed that opinion decidedly in writing. We curetted the uterus, but got nothing and found no cause for the hemorrhage. There was no more bleeding until the last of September, and then slight; it occurred again during the latter part of October. In November I curetted, but got nothing except normal mucous membrane. On November 17, 1893, sudden and severe bleeding took place, and again on February 22d and 27th. I suggested etherization and curetting, and, if malignant adenoma was found, immediate hysterectomy. This was thought to be too radical, and I curetted again. Dr. Whitney reported hyperplasia of the endometrium. There was no evidence of cancer or other malignant growth, but the uterus had become enlarged; its cavity was four inches deep. So the case went on with slight hemorrhages, slight rises of temperature, discomfort and discouragement. I could find no evidence of cancer, yet I could not account for the bleeding. On May 11, 1893, Drs. Lusk, Cleveland, and I again met in consultation in Boston. The patient was etherized and the uterine canal was dilated so as to admit the finger; a distinct solid growth was felt in the right posterior uterine wall. At the patient's age it seemed likely to be malignant, but it did not feel like cancer, and there had been no offensive, clear, or bloody discharge and there was no infiltration and no adhesions in the neighborhood of the uterus. We concluded that the growth might be a sarcoma, instead of deciding correctly, as common sense would have told us, that it was the most common uterine growth and the most common cause of uterine hemorrhage—viz., a fibroid tumor protruding into the cavity of the womb. But, whatever the growth was, it was clear that there was only one thing to be done, and that quickly—namely, the removal of the uterus, and the conditions were eminently favorable for extirpation. I removed the uterus by the vaginal method to be described, using clamps on the uterine arteries, and ligatures on the ovarian.

Dr. Whitney's report is as follows: "The uterus measured about four inches, the wall three-quarters of an inch. The interior was covered by a thin, smooth membrane, marked by a few hemorrhagic spots; the cavity was dilated and partly filled by an oval tumor measuring two and one-third inches in its longest diameter and covered, except at its base, by the reflected mucous membrane. The base of the tumor was more or less intimately adherent to the muscular tissue of the fundus, where it had evidently originated, and from which point it had pushed its way into the uterine cavity, causing gradual dilata-

tion, and carrying the mucous membrane before it. The growth was of moderate consistency; on section it was found to be relatively loosely attached to the surrounding tissue. The section-surface was in general uniformly grayish-white in color, with here and there little slit-like openings; microscopic examinations showed its structure to be a richly cellular fibromyoma, with large and abundant lymph-spaces. In the substance of the wall at the fundus was a second, in every way similar growth of the size of a large cherry. The diagnosis is intramural and submucous polypoid fibromyoma of the uterus." In this case the diagnosis had not been correctly made either here or in England. The case was clearly not one of cancer, and yet fibroid polypus would not be expected in a woman of sixty-three years. The specimen shows that the surgical treatment of the case was correct, for if I had found and removed the partially extruded tumor from the cavity of the uterus, the other one in the fundus would have descended and would have caused hemorrhage later on. The patient recovered quickly, and is now—four years later—very active and in excellent health.

The mistake and difficulty in diagnosis in this case were caused by the patient's age. The British surgeons inferred cancer on account of hemorrhage at the age of sixty-three, and the Americans did not expect a woman of sixty-three years would extrude a fibroid tumor from a senile and presumably atrophying uterus. The practical treatment of the case, however (and that is the reason why I have stated it at such length), was never in doubt in my mind. Vaginal hysterectomy was the proper thing to be done, and would and did effect a cure.

THE TECHNIQUE OF HYSTERECTOMY. I take it that the technique of an operation means the special manipulations that are necessary to perform it. In my descriptions I shall suppose once for all that the instruments, ligatures, gauzes, etc., have been thoroughly sterilized and are completely aseptic, that the patient's bowels have been opened, that the abdominal parietes have been shaved and otherwise properly prepared, that the vagina and uterus have been disinfected, and that all the accessible parts involved have been made clean; that the patient has been enveloped in a sterilized flannel suit, which will keep her warm and diminish shock; that she has received a subcutaneous injection of one-eighth of a grain of morphine, and one one hundred and twentieth of atropine, which tends to diminish the bronchial secretion and to bridge over, or lengthen, the time of unconsciousness after etherization and to keep the patient sleeping instead of coming out of the state of insensibility produced by the anæsthetic; that the surgeon and assistants have made themselves as sterile as possible. Having this clearly understood, I will not consume time in describing the necessary proceedings to obtain the above results. Once for all, let us discard the old-fashioned *serre-nœud* and pin of Kœberle; it served us well, but is now entirely out of date and should be wholly abandoned.

I will begin by describing the simplest hysterectomy, for the simplest

condition requiring the operation — namely, for intractable uterine hemorrhage without discovered malignant or fibroid disease. In this case the vaginal route is to be followed. It is important that the retractors and other instruments shall be specially adapted to the work and reliable, because one must see clearly what he is doing and do nothing by feeling; that the clamps shall not spontaneously spring open and allow the broad ligaments to escape from their grasp. The retractors and other instruments of Ségond are excellent. If the assistants are accustomed to helping the operator, so much the easier. The patient should be put in the lithotomy position and the legs should be held up by any method that is thought best. A circular incision around the os completely through the mucous membrane is made, and also two incisions on either side parallel with the axis of the organ and about one-half inch in length. The position of the bladder-wall is ascertained by a curved sound passed into the urethra and felt through the upper vaginal wall. While strong traction is being made on the os and neck the bladder is peeled off from the uterus along the line of cleavage which, in the normal condition of things, is easily found. When the sound can be felt through the bladder-walls above the hand it is probably pretty thoroughly and safely separated through the uterus. An opening is next made with scissors, or with the ends of a pair of forceps, through the peritoneum of the anterior cul-de-sac into the abdomen, and a retractor, not too wide, lest it draw the ureters into the wound, is passed into the opening, and, being carefully held by an assistant, keeps the bladder out of the way and prevents the intestines from descending. Next, an opening is made with more freedom into the posterior cul-de-sac, and is enlarged with the fingers. A piece of gauze with the end hanging out or a gauze sponge with a string of silk attached is inserted between the uterus and rectum. Next the fundus of the uterus is anteverted and pulled down beneath the bladder, and a strong clamp is put on the left broad ligament, parallel with the long axis of the uterus. If it is thought best to remove the ovaries, it is easier to pull them down before putting on the clamps. The same procedure is gone through with on the right side, and the uterus is cut away between the clamps. It is important to leave sufficient tissue on the uterine side of the clamps to prevent the broad ligaments from slipping out. During the course of the operation any vessels that bleed unduly can be secured in pressure-forceps or tied. It is a matter of indifference whether the ovaries and tubes are removed or not. The main thing is to get rid of the bleeding mucous lining of the uterus, and, as curetting has not succeeded, we remove the whole organ.

Such cases invariably recover, if one can say that any class of cases invariably recover.

The technique for malignant or fibroid diseases of the uterus by the

vaginal route is the same as that just described for the removal of the non-malignant uterus. Adenocarcinomata for this purpose may be considered non-malignant; but all infected tissue should be freely removed from the vaginal wall, and as far as possible from the broad ligaments. The ovaries ought also to be removed. At the present time the weight of surgical authority is in favor of opening the abdomen in order thoroughly to remove malignant disease.

Some surgeons begin the operation by passing sounds into the ureters in order to define their position, so that they may be avoided and not cut or compressed during the necessary manipulations. To the majority of surgeons this operation of passing sounds into the ureters is not easy, nor is it necessary for them to learn it, and although this technical proceeding has great advantages, yet it is not likely ever to be universally practised. All the glands in the neighborhood of the uterus should be removed. The peritoneum should be lightly stitched together if the operation is done by the abdominal route, but no stitches need be taken if it is done by the vaginal route. The Association is referred to vol. xii. of its *Transactions* for further remarks on this subject, in a paper which I had the honor to read before it in 1895. The ovarian arteries are tied outside the ovaries in each broad ligament, and the uterine arteries on each side of the cervix. Separation of the os from the vagina previous to opening the abdomen facilitates the removal of the uterus, and in some instances the uterine arteries are easily secured and tied through the vagina before the abdomen is opened.

The technique for the removal of the uterus on account of cancer will vary according to the type of the disease. The adenocarcinoma which has not extended beyond the body of the uterus may be removed by the simple vaginal method, using clamps or ligatures, as the operator prefers, to secure the vessels.

Operations for hysterectomy in adenomatous cases are almost uniformly successful and, in my experience, are never followed by recurrence. The other forms of cancer of the uterus are followed by recurrence probably in at least 70 per cent., and possibly in more, of all cases operated upon.

Hysterectomy is necessary in cases of fibroid tumors which cannot be enucleated either from the inside or from the outside of the uterus. The technique of hysterectomy for fibroid tumors consists in removing them by the abdominal route through an incision in the abdominal parietes, or through an incision in the vaginal walls, or by a combination of the two methods, the os and neck being freed from their vaginal surroundings through the vagina before or after we open the abdomen. If before, we may with advantage tie the uterine arteries through the vagina. It is necessary to resort to morcellation, or cutting the uterus in pieces, in many cases. Sometimes the vaginal method is preferable, and sometimes the abdominal. I have formerly been in the habit of removing large

fibroids by the abdominal route, and leaving a button, consisting of a small portion of the neck and os. This gives, theoretically at least, and I should suppose practically, a better pelvic floor than when the whole organ is removed. Lately I have usually removed the whole uterus, and I think it takes no more time to separate the neck from its vaginal attachments than it does to sew up the uterine canal, as one has to do when the os is left.

The technique of abdominal hysterectomy, when we decide to leave the neck and os, is as follows:

The patient is wrapped in a sterilized flannel suit made out of a large, thick blanket, either in one piece or in two pieces, like pajamas. This was suggested to me by my first assistant, Dr. Edward A. Pease, and is one of the causes of success. It prevents, as far as possible, any lowering of the patient's temperature, and keeps her warm during the operation and afterward. I regard this as one of the important procedures in these cases. The legs and arms of the wrap are sewed up at the ends, and the abdominal portions can be tied together with tapes, and loosened and separated for the purpose of making the incision in the anterior abdominal parietes. There is no place for the external air to get in, except while the abdomen is open. The patient is placed in the Trendelenburg position. Indeed, without this position the intraperitoneal removal of fibroids in a satisfactory manner would be impossible. The incision is made of the required length and the tumor is delivered at once, if free from adhesions, by means of a corkscrew, or by any method of traction which seems most easy. A piece of gauze spread over the tumor is found very convenient in preventing it from slipping away from the hands of the operator. A large piece of gauze is now put in the abdomen over the intestines, and the sides of the incision above the tumor are often fastened together by catch-forceps, or by a temporary stitch, to prevent the intestines from protruding and to keep them clean and warm. The tendency of the bowels to protrude varies in different patients. In most cases the intestines lie still and quiet. In others they seem to leap out of the abdominal cavity whenever they get a chance. If in the process of lifting the tumor out of the abdomen adhesions are discovered, it is best to secure them by clamp or ligature, or to pass an elastic ligature around the neck of the tumor or of the uterus to prevent hemorrhage. This last procedure is rarely necessary. When the broad ligaments are seen, I tie the left one first, passing the ligature low down and close to the uterus by means of Cleveland's needle, being most careful not to perforate the bladder; then I tie another ligature about an inch further away from the first toward the ovaries and beyond the tube, or beyond the ovary and the tube, and divide the broad ligament between them. The tube, if left intact on the uterine side, prevents infection from a source to which the patient would be exposed if the

tube was opened. I leave the broad ligaments as long as possible, so that my seam over the stump, when the operation is finished, will be a short one. I do not care whether the ovary is tied off or not, nor do I necessarily remove it, for it is well supplied with blood from the ovarian artery, and will not slough when its uterine connections are cut off; and, in fact, may be well enough nourished by adhesions; besides, if it remains, perhaps the physiological symptoms, which are often annoying after removal of the ovaries and uterus, the so-called "heat-flashes," etc., may not occur if the ovaries are left. For the ovaries are the reigning powers in the generative organs. The expression should be, "The ovaries and their appendages;" not, "The uterus and its appendages." The uterus and vagina are simply channels for the nourishment and passage of the ovum and fetus, the product of the ovary, and serve to expel the infant into the world. In cases of imperfect development the vagina may be wanting, or the uterus may be wanting, but their absence does not imply that of the ovaries. If the latter, however, are wanting, the other organs, I believe, always are. I now go through the same process on the right side, and then make a circular incision through the peritoneal covering of the uterus in front about two inches above the outline of the bladder-wall, which can usually be plainly made out by sight, without passing a sound into the bladder, and the same distance above the rectum behind, the two incisions meeting on either side where the broad ligaments are tied, exactly as one would make a circular incision for the amputation of the thigh. These peritoneal flaps I then turn back. By not getting beneath the peritoneum into the muscular tissue of the uterus the separation is easy and bloodless; but if at all deep, it is difficult and hemorrhagic. The uterus above the internal os has now been denuded of its peritoneum and is ready to be divided. I then look or feel for the pulsations of the uterine arteries, unless they have been tied from the vagina; and if I find them easily (and they are quite superficial), I tie them by passing a ligature of silk around them with an aneurism-needle, each one separately; but if I do not find them easily, or if there is a hemorrhage going on, from my flaps having been too thick, I encircle the uterus at the denuded point with a strong, small, solid cord of rubber, and, having tied it securely, I cut the tumor and uterus away, and later secure the uterine arteries at my leisure. I now trim away the uterine tissue by a slanting cut in front, and behind, the apex being at about the level at which the uterine arteries have been tied. I cauterize very thoroughly the uterine cervical canal at once, as soon as it is opened, with Paquelin's cautery. I always pass the point through the mouth of the uterus well into the vagina and allow it to remain there several seconds. The cauterization must be so thorough that the opening remaining will be large enough to act as a drain for the sloughing which always follows the application of

a hot cautery, otherwise the external os may get occluded by the swelling which naturally follows any injury to living tissues; an infection from the sloughing mucous membrane might work its way back and contaminate the stitches by which the abdominal end of the stump is closed, and perhaps also the space lying between the stump and the peritoneum. One of the advantages of the closing of the peritoneum is that, even if this blind space does get infected and an abscess is formed, the peritoneal cavity is not infected, and only a localized collection of pus is formed, which may open spontaneously or be opened from Douglas's cul-de-sac. This I have never been obliged to do, though nature opened such an abscess for me once. There was good drainage, however, and with hot vaginal douches the trouble soon ceased. Next I sew the muscular walls of the neck, by a continuous suture of silk, over the cervical canal, so as to shut out the neck from the abdominal cavity. In sewing the sides of the stump together it is important that the silk be put through healthy tissue, and not allowed to pass through the tissue which has been cauterized, as this must slough away, and in this way the silk might get infected and cause an abscess or a discharge from the ligatures. I then sew the peritoneal flaps together by a light continuous suture over the stump. I always use the fine English braided silk, No. 4; for this suture I do not dare trust to the aseptic qualities of catgut. You will see that although this method is called intraperitoneal, it is really extraperitoneal, even more so than the plan by which the neck is constricted by the wire and held outside the skin of the abdomen by a pin across the abdominal wound. I next turn my attention to the ovarian and round ligaments stumps and tie the ovarian arteries again separately. If the ovaries have been removed in whole or in part, I decide whether to remove them more completely or leave them. There is now a sutured line running across the lower part of the pelvis; and if there is no oozing, the abdomen is emptied of the pieces of gauze which have been put into it, the patient is lowered into a horizontal position, the omentum is pulled down, the intestines descend to their normal place, and the abdominal wound is closed with silkworm-gut sutures without drainage. The flannel suit is left on the patient twenty four hours or more, according as seems best. The convalescence is like that after a simple ovariectomy. The patient is generally up and about on the fourteenth day, and goes home by the end of the third week. This rapidity of convalescence is in great contrast to that following the treatment of the pedicle by the clamp, which latter method should be entirely discarded.

The technique of complete hysterectomy—"pan-hysterectomy"—for fibroid tumors will vary from the above-described operation only in the fact that the os and the neck are separated wholly or in part from the vaginal wall before we begin our abdominal dissection, and at the close

of the operation the vaginal walls are sewed together, and the peritoneal flaps which we have separated anteriorly and posteriorly from the uterus are lightly united by a suture of very fine silk. I never use catgut, as I have found it difficult to make it aseptic, and I have never had trouble with silk. I have usually done the vaginal part of the operation first, but I can see that there are advantages on the side of cleanness in doing it at the close of the operation rather than at the beginning. Usually I remove the uterus completely at the present day, and do not leave neck or os, as I have once or twice found the organ affected with cancer, and the time taken in doing the vaginal part of the operation, as I have already said, whether from above or below, is no longer, if it is as long, as the time taken in sewing up the uterine canal.

The technique in cases of prolapse and of inversion is exactly the same as the method first described for the simplest cause of removal when the case is not one of cancer, except that one must be more than ordinarily careful about injuring the bladder, and then often one must subsequently do an anterior and probably a posterior colporrhaphy in addition to the hysterectomy, or else sew the vesical part of the vagina to the round ligaments. In all the cases where an opening has been made from the vagina into the peritoneal cavity gauze should be put in the vagina at the close of the operation, to act as a drain, and where compressing-forceps have been left upon the broad ligaments the gauze should be wrapped around them to prevent abrasion of the neighboring parts.

Two cases will illustrate the kind of case mentioned under the sixth head (infected uterus) of the list of conditions in which hysterectomy is necessary. The first was that of a married lady, thirty-four years of age, who had been married twelve years. She was well until one year after marriage. She had had no miscarriage. When she had been married six years she was confined with a stillborn child, and was delivered with instruments; was sick in bed for six months. A year later an abscess formed, and was supposed to have discharged into the uterus. The abscess is said to have gathered once a month for four months, on one side or the other. Subsequently she had been curetted several times. She had been in bed for three months when she came to me in November, 1895, and said she had had discharges of blood and pus from the rectum several times. Two years before this she was in a nerve asylum. She had considerable pain and tenderness in both iliac regions. I operated by the abdominal route on November 23, 1895. The uterus and tubes were thoroughly adherent, and their outlines could not be easily made out. The tubes only were removed. She recovered rapidly from the operation, and gained flesh, strength, and activity, and considered herself remarkably well. She left the hospital at the end of about three weeks, remarkably active and feeling perfectly well. She

had no pain, but there was some discharge from the uterus. Two weeks later, having been walking a good deal, she began to have back-ache and headache; the uterine discharge became more profuse, and she had so much pain and discomfort that she re-entered Saint Margaret's Home, and on January 21, 1896, I removed the uterus by the vaginal route, using clamps to secure the vessels. She has been perfectly well ever since, is very active, and is entirely relieved of her pain and distress.

Another case was that of a woman, thirty years old, who had been married fifteen years. She had been well until a miscarriage, which occurred about twelve years before I saw her. This was followed by double salpingitis. Five years later the ovaries and tubes were removed on account of chronic salpingitis, and were found to be very purulent. She recovered from the operation and gained flesh and strength, but her pain returned, and became so excessive in her abdomen and back, with an abundant discharge from the uterus, that she decided to undergo an operation, and I removed the uterus by the vaginal route. There was considerable hyperplastic endometritis, and a small polyp about three-quarters of an inch long was found at the opening of the right Fallopian tube. This condition of things was probably the cause of the bloody discharge. She recovered rapidly, and has since been relieved of her pain and discomfort.

The operation for the cure of puerperal sepsis should, as a rule, be done by the vaginal route, using clamps to secure the vessels, as these insure good drainage. Should the diagnosis of general peritonitis be made, the abdominal route should be followed, and the peritoneal cavity should be thoroughly washed out and drained.

After every hysterectomy, for whatever purpose done, a Jacques's self-retaining catheter should be put in the bladder for a few days.

On the whole, the best operations for large fibroids should begin with free separation of the vesical and rectal walls in the vagina, accompanied by ligature of the uterine arteries, if these are easily found, to be followed by laparotomy and removal of the tumor through the abdominal wound.

TROPICAL ABSCESS OF THE LIVER,

WITH A CONSIDERATION OF ITS PATHOLOGY AND CLINICAL HISTORY.

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(Concluded from page 166.)

THE *amoeba coli*, described first by Lösch in 1875, in the stools of an individual with dysentery in St. Petersburg, has since been found in dysenteric discharges, in the pus of liver- and lung-abscesses, and in lesions of the colon, liver, lung, and pleura; in cases in Egypt by Kartulis (1885-1891), Koch (1887), and Krause and Pasquale (1893); in Russia, by Massiutin (1889); Bohemia, by Hlava (1887), Kovacs (1892), Epstein (1893); in Gratz, by Cohen (1891); in Italy and Sardinia Calandruccia, and by Fenaglio (1890); in Baltimore, by Osler, Löffler, Simon, Councilman and Lafleur, Howard, Thayer (1890-1893); in Texas by Dock (1891); in Philadelphia by Musser and Stengel (1890); in Cincinnati by Eichberg (1891); in Alabama by Wilson (1895), and by others in America; in Germany by Nasse (1892), and Quinke and Roos (Kiel, 1893); in Greece by Kartulis (1890); and in Brazil by Lutz (1891).

As far as we can find, *amoebæ* have not been looked for in the dysenteric and liver-abscess of India, though they have been found in liver-abscess in England, occurring in returned East Indians (Mason and Galloway).

The *amoebæ* described by Lösch varied in diameter from 8 to 37 μ , and had one or two blunt pseudopodia. The ectosarc was apparent only in the resting stage; the endosarc was firmly granular and contained small non-contractile vacuoles, besides red blood-corpuscles, intestinal epithelium, and fecal particles. There was a vesicular nucleus of from 5 to 7 μ in diameter.

The chief difference between the *amoeba* of Lösch and the *amoebæ* described by later authors is one of size, the latter being uniformly larger—from 10 to 50 μ in diameter. Kartulis has described "giant *amoebæ*" measuring from 150 to 222 μ in diameter. Certain other differences have been noted by various observers. Kartulis, Osler, Councilman and Lafleur, and Kruse and Pasquale have given very accurate descriptions.

According to Councilman and Lafleur, when inactive, the *amoebæ*

are round or slightly oblong and more refractive than the other cells in the containing discharges. While at rest there is usually no distinction between the ectosarc and the endosarc, but the organism has simply the appearance of a body enclosing clear, pale vacuoles of varying size, which vary from bodies a third the size of the organism to tiny vacuoles. When the organism sends out pseudopodia the ectosarc appears as a pale, hyaline, homogeneous substance, less refractive than the inner substance.

Nearly all observers have noted two kinds of motility—a progressive movement which is slow and a movement characterized by the pulling out and retracting of pseudopodia. An amoeba may suddenly put out and retract large pseudopodia, and then remain quiescent. This may be repeated at varying intervals. In others the movements are slow and prolonged. A very irregular contour of the organism is produced by the putting out of several pseudopodia at the same time. The pseudopodia are always blunt, and they have the same hyaline appearance of the ectosarc, and in some instances are very long. Often the contents of the amoeba rapidly flow into the protruded part and change of place occurs. The nucleus is made out with difficulty in the first state, being often obscured by the large vacuoles. The nucleus does not stain with methylene-blue, but will stain well with acid fuchsin, safranin, and eosin. Councilman and Lafleur obtained the best results with sections hardened in Flemming's solution and stained with safranin, but also obtained good results from alcohol sections stained with methylene-blue. They found that the nucleus lies near the surface at the edge of the endosarc, is vascular, disk-shaped, and about the size of a red blood-corpuscle. These authors do not think that the endosarc is granular, but that this appearance is given it by the presence of very small vacuoles.

The amoebae often contain foreign bodies, such as red blood-corpuscles, either well preserved or in various stages of disintegration, leucocytes, small round cells, epithelial cells, hepatic cells, nuclei of broken-down cells, blood-pigment, micrococci, bacilli, and spores.

Kruse and Pasquale distinguish four varieties of amoeba in stools:

a. A form with poorly differentiated endoplasm, with small scattered granules, and very highly refractive, which distinguishes it from the ectoplasm. This form is found in normal feces.

b. Amoebae with highly granular endoplasm, the granules being very irregular in size, but usually small. This form they found only uncommonly in dysenteric stools.

c. Amoebae, the endoplasm of which is apparently a conglomeration of larger and smaller vacuoles. This form they found most common in dysenteric stools.

d. Amoebae with endoplasm containing many foreign bodies, as red blood corpuscles, leucocytes, bacteria, pigment, etc.

They describe the nucleus, in the amœbæ of normal as well as that of the dysenteric stools, as being about the size of a large vacuole, with an average diameter of $6\ \mu$. They note two modes of multiplication, division and sporulation, but were able to prove neither way for amœbæ of either normal or dysenteric stools. They describe an encysted stage, and were able to infect cats with this form.

Amœbæ have been found in the stools of healthy persons by Grassi, Kruse and Pasquale, and Shuberg, as well as in the stools of persons with various intestinal diseases, as typhoid fever, cholera, pellagra, colitis (Grassi, Cunningham). Kruse and Pasquale found numbers of amœbæ in the stools of healthy persons, including their own, in Naples, but rarely in Egypt.

Shuberg found amœbæ in the stools of twenty healthy persons after the administration of Karlsbad salt, but never after castor-oil, which he thinks must exert a harmful action on these organisms. Shuberg's explanation of the occurrence of amœbæ in the stools after taking the salt is that the usual acid reaction of the intestine is in this way modified, or rendered alkaline, thus favoring the growth and multiplication of amœbæ which may be taken in food and water, but which are usually killed by the ordinary acid reaction of the colon.

Kruse and Pasquale were unable to find any constant morphological differences between the amœbæ of normal and dysenteric stools, except that the amœbæ found in the latter caused colitis with ulceration in cats, while those in the former were harmless for these animals.

Quinke and Roos have carefully studied the amœbæ found in two cases of dysentery. In the stools of the first case they found rather small amœbæ (20 to $25\ \mu$) with rather finely granular protoplasm and round nuclei. The amœbæ-containing stools of this case when introduced per rectum were pathogenic for cats, the animals dying in from two to three weeks with an ulcerative inflammation of the large intestine. Amœbæ introduced per os were harmless, while encysted forms introduced by this channel caused dysentery in cats.

In their second case the amœbæ were from 25 to 30 or $40\ \mu$ in diameter, were coarsely granular, contained many vacuoles and foreign particles, but no red blood-corpuscles, and were less actively motile than those of the first case. Encysted forms were also seen. Repeated injections of the stools of this case caused a diarrhoea without anatomical lesions in cats. These authors repeated Shuberg's experiment upon twenty individuals, some healthy and other patients in the medical clinic. Amœbæ were found in the stools of nine, but were numerous in only three cases, and were not pathogenic for cats. Based on these observations, Quinke and Roos make three classes of amœbæ parasitic for men:

1. Amœbæ *intestini vulgaris*, $40\ \mu$ in diameter, with large granulations; pathogenic for neither men nor cats.

2. *Amœbæ coli mitis*, of about the same size and appearance as the above; pathogenic for men, but not for cats.

3. *Amœbæ coli Lösch*, or *amœbæ coli felis*, about $25\ \mu$ in diameter, finely granular, and producing dysentery in both men and cats.

Kartulis (1891) first produced dysentery in cats by rectal injections of amœbæ-containing stools. He also claims to have cultivated amœbæ from dysenteric stools in straw-infusion, and to have produced the disease in cats by rectal injections of these amœbæ. No one has so far been able to repeat these experiments. The attempts of Kruse and Pasquale to cultivate amœbæ from stools were unsuccessful, and they think that Kartulis was dealing with the amœbæ of straw-infusion, and not with dysenteric amœbæ.

Kruse and Pasquale produced well-marked inflammation of the colon, with ulceration, in cats by rectal injections of the amœbæ-containing dysenteric stools, and also of amœbæ-containing, but bacteria-free, pus from a liver-abscess. Numbers of amœbæ were found in sections of the hardened tissues. These authors found the amœbæ-containing stools of healthy persons harmless for cats. They think that the only way in which a positive diagnosis between the pathogenic and the harmless intestinal amœbæ can be made is by animal experiment.

Braun, in a careful review of all the observations on the subject, considers that there are two specific kinds of amœbæ for men and cats, the one with fine granulations, which is pathogenic; the other, coarsely granular, is harmless. He does not think that the pathogenic amœbæ are infectious per os, but that the encysted forms are.

Amœbæ have been described as being present in the human mouth by Gros, Sternberg, and Grassi. In 1883 Baelz described amœbæ $50\ \mu$ in diameter in the bloody urine and in the vagina of a woman with vesical tenesmus. In 1889 Jürgens found amœbæ in a case of mucous cysts of the bladder. Kartulis found amœbæ from 12 to $20\ \mu$ in diameter in the urine of a man with tumor of the bladder. In 1893 Pasner described amœbæ in the urine of a man with hematuria. Flexner has described amœbæ indistinguishable from the *amœba coli* in the pus from an abscess of the jaw. Kartulis has reported a somewhat similar case from Alexandria. Nasse has described amœbæ in the gangrenous skin and muscle of the chest in a man operated on for amœbic abscess of the liver.

Of all those who have attempted to cultivate the *amœbæ coli*, until very lately, Kartulis alone has reported positive results.

In 1894 Celli and Fioeca reported that they had succeeded in cultivating amœbæ from the intestinal contents of healthy men and of men with different intestinal diseases, from the vaginal and buccal secretions and from the intestines of animals, and in waters from various sources, upon a special culture-media devised by them; amœbæ failed to grow

in the ordinary laboratory media. They did not describe the media they used.

They conclude from their studies that all amœbæ have two stages, the amœboid and the encysted. In the encysted stage the contents of the organism are more or less granular, and are included in a double-wall capsule, the inner wall of which is smooth, the outer being either smooth or wavy, so that the contour of the cyst may be either smooth or wrinkled. In the amœboid stage the endoplasm they describe as being granular, while the ectoplasm is hyaline. A vesicular nucleus and from three to seven vacuoles can usually be made out. The amœbæ feed on solid bodies, especially bacteria and their spores, and break up red blood-corpuscles without setting free the pigment.

Multiplication was always by division, and they failed to observe sporulation.

In hanging-drop preparations of encysted forms, in most cases in from two to six hours, the contents of the encysted forms became granular, the nucleus apparent, and the organism motile. In a variable time, through a break in the cyst-wall, the organism is discharged, and, after clinging for a short time to the side of the cyst, is set free as a young amœba. In a short time this will divide, and amœbæ rapidly multiply. This process usually lasted from twenty-four to seventy-two hours. In some forms encapsulation begins after twenty-four hours, and in others after forty-eight or seventy-two hours. After from three to seven days the outer wall takes on a round or wrinkled contour. After a certain time, if these amœbæ were placed in a new medium, the cycle began again. In certain cases, however, involution-forms, very finely granular, more or less round, and with wrinkled contour, were observed. According to these authors, both the amœbæ and the encysted forms can resist without dying a temperature of from 0° to 15° . In the amœbic stage they die of exposure to a temperature of 45° for five hours, or 50° for one hour. In the encysted stage they can bear 60° for one hour, or 55° for four days, and for seven days a temperature of 67° for several hours a day. They withstand more or less rapid drying in either diffuse light or in darkness. They withstand sunlight in dry or damp substances for 270 hours at a temperature of from 12° to 15° .

Amœbæ would not grow in anaërobic cultures, although they may be found two metres below the surface of the ground. In putrefying animal fluids amœbæ die after twenty-three days, encysted forms after thirty-three days. Both amœbæ and encysted forms were killed by the action of various chemicals, as soon as the bacteria that were with them; more quickly by acid than by alkaline solutions, however.

They were not able, either by chemical or by mechanical means, to obtain bacteria-free cultures of amœbæ.

In a later article Celli and Fiocca, based upon their studies by culture-

methods and otherwise, classify amebæ obtained by them from various places, including the normal and dysenteric stools, stools from cases of intestinal catarrh, the intestines of animals, from the water of wells, springs, river, swamps, and from the ground and from dust. In dysenteric stools, besides the ameba coli, they found other forms (*A. spinosa*, *diaphana*, and *reticularis*). Some of these organisms were found in the contents of the normal intestine as well as in cases of intestinal catarrh, and even in the vagina. According to these authors, amebæ may be carried from the ground to the air in dust. Amebæ were not found in the mouth or pharynx, nose or ear.

They describe four varieties of amebæ lobosa, and place the ameba coli Lösch under this head. In all they describe five species, and they give descriptions and cultural characteristics of these, but do not describe the media they used.

In January of the present year Beyerinck described two varieties of amebæ cultivated by him upon solid media. He found that a peculiar earth amebæ grew upon a special media made with agar, which he used for the study of the bacteria of nitrification. He gives full directions for making this media, for which the reader is referred to his article. Upon the surface of his agar-plates this peculiar spore-formation amebæ grew rapidly, the colonies appearing first as small granular points on the surface, and from these the growth in some cases spread all over the surface of the plate. The amebæ in this manner followed distinctly the colonies of the earth bacteria which grew in the culture, feeding upon these organisms. The amebæ cultures were best transferred by inoculating them upon an agar-plate which had already a growth of earth bacteria. In this case the amebæ multiplied, feeding upon the bacteria. He gives an interesting description of this organism, which he calls ameba nitrophila, and finds it very common in garden earth.

Later, on making cultures from some fermenting grapes, he found, besides *saccharomyces apiculatus*, a peculiar dimorphous glucose-yeast and an acetic-acid bacterium, a form of amebæ which he thinks was perhaps identical with ameba coli Lösch. The medium used in this case was malt-extract gelatin. He gives a most interesting account of the modes of growth and of the cultural characteristics of this ameba on malt-extract gelatin, beef-peptone gelatin, on agar, and on his nitrification media.

The organism multiplied rapidly, growing both in separate colonies and as a spreading, veil-like growth over the surface of the media and under a variety of conditions. It would grow well with the *apiculatus*, or with the acetic-acid bacterium, or with both, using either or both these vegetable forms as food. An interesting phenomenon was the liquefaction of the gelatin, which occurred in all gelatin-cultures, but most especially well marked in malt-extract gelatin. It was better

marked in cultures of amœbæ plus apiculatus, with a neutral or alkaline reaction, than in cultures with the acetic-acid bacterium.

This peptonization of the gelatin he thinks is due to an enzyme set free from the amœbæ as a waste-product, not by simple diffusion, but through the vacuoles, and that this enzyme is trypsin. It is free from diastase, glucose, and invertase. This amœba, which he calls amœba zymaphila, has a nucleus. There are no pulsating vacuoles and no "neben-vacuolin," as in his amœba nitrophila.

Spore- and cyst-formation were not observed, and multiplication took place by simple division.

In a third article Celli gives his method of cultivating amœbæ upon solid media. He succeeded in getting a scanty culture upon alkalinized potato, ascitic fluid, and egg albumin. He got good results with fucus crispus made up like agar, 5 per cent. in water, with or without bouillon, and rendered strongly alkaline. In this medium he obtained pure cultures of different varieties of amœbæ, including the amœba coli.

Schardinger has cultivated various protozoa on gelatin and on bay-infusion agar, on the latter medium obtaining cultures of the amœba coli from the stools of a patient with dysentery. He describes an encysted stage, and was able to grow amœbæ from this.

These observations and the ability to cultivate amœbæ on solid media promise much in the near future in the study of the etiology of protozoan infections. The enzyme-producing amœbæ of Beyerinck is of peculiar interest. As Councilman and Lafleur point out, there are focal areas of cell-death not associated with the presence of amœbæ, occurring in the liver in cases of amœbic dysentery, which they suggest is due to the action of soluble toxins produced by the amœbæ in the intestinal lesions. This observation of Beyerinck is a valuable confirmation of their interpretation of the process. It also suggests that the cell-destruction and liquefaction of the tissues in the amœbic processes may be due to the action of this or of a similar ferment.

Bacteria are not uncommonly associated with amœbæ in the liver- and lung-abscesses, as well as in the intestinal lesions.

Kartulis, in cultures from thirteen cases of liver-abscess, found bacteria in five, the staphylococcus pyogenes in two, the staphylococcus pyogenes albus in one, the bacillus pyogenes fetidus in one, and the proteus vulgaris in one.

Councilman and Lafleur found bacteria in the sections from liver-abscesses in three of six cases, but obtained positive results by culture-methods in only one case—the colon-bacillus. They call attention, however, to the presence of bacteria in the intestinal lesions, where these organisms may modify to a greater or less degree the lesions caused by the amœbæ.

In seven cases of liver-abscess associated with dysentery, in Egypt,

Kruse and Pasquale found streptococci in three cases and staphylococci in two. With these there were often found "typhoid-like" bacilli (colon-bacilli?) and streptothrix. In cultures made from dysenteric stools they found streptococci the predominant organism. In three cases dead of amebic dysentery they found streptococci in the liver, and in one of these in the mesenteric glands and in the portal vein. In a fourth case streptococci were found in the mesenteric glands. In Case IV, we found in the liver-abscess and in the pleura and pericardial exudations the staphylococcus pyogenes aureus, the colon-bacillus, and a long, unidentified bacillus.

Flexner has found streptococci in small abscesses of the liver in a case of amebic abscess of the liver, with perforation of the vena cava and hemorrhage into the abscess. No amebae were found in the small abscesses, but in the large abscesses there were amebae and a variety of bacteria. All these authors regard the presence of bacteria in this variety of hepatic abscess as secondary invasions, mixed infections, and as bearing no etiological relation to the primary lesion. The presence of bacteria in the intestinal lesions is to be regarded in the same light.

While careful search practically always demonstrates the presence of amebae in the secondary liver, lung, and pleural abscesses occurring during the course of or following amebic dysentery, very little is known of the etiology of the so-called "idiopathic" abscesses of the liver; that is, in those cases in which the process is apparently primary in the liver and not secondary to intestinal lesions.

So far as we can learn, amebae have never been demonstrated in this form of liver-abscess. In the cases examined bacteriologically by Kartulis, the staphylococcus pyogenes was found in four and the staphylococcus albus in one; the remainder were sterile.

In seven cases Kruse and Pasquale found the bacillus pyocyaneus in two, the staphylococcus pyogenes aureus in one, the staphylococcus in one, and typhoid-like bacilli in one. None of their cases came to autopsy, the pus being obtained by aspiration or at operation.

There are many reasons which make it seem probable to us that certainly a large proportion, if not all, of these abscesses are caused by the ameba coli, or at least by a similar organism. No constant variety of bacteria is found in them, and the form of reaction, so far as we know it, points to their amebic origin. The characters of the pus in the two varieties is described as being the same. As is well known, in cases of amebic abscess of the liver associated with a previous or with an existing dysentery, amebae may be very scarce or even entirely lacking in the pus, especially if the process is an old one, and the walls are firm and fibrous and the pus is obtained by aspiration. One of us has observed this repeatedly. In all the cases of idiopathic abscess reported

by Kruse and Pasquale these conditions evidently obtained—the pus was obtained either by operation or aspiration.

The walls of the abscess were not examined for amœbæ, and it cannot be positively stated that they were absent.

In both varieties the pus is described as being very much the same, usually anchovy-like in color and consistence, poor in cells, especially in leucocytes, and consisting chiefly of granular detritus. The absence of leucocytes points more decidedly to the amœbic than to the bacterial origin of the idiopathic abscess.

There is absence of a history of primary suppuration elsewhere, and the seat of the abscess is very constantly the same as that of the dysenteric form. In the two varieties, bacteria, usually the pus-cocci and the colon-bacillus, are found in about the same proportion of cases, and their presence can be explained as secondary mixed infection in the one case as in the other.

As pointed out by Kartulis, Councilman and Lafleur, and Kruse and Pasquale, in the amœbic dysentery the amœbæ are in the intestinal glands, about the ulcers, in the mucosa, and in the submucosa. They are found not infrequently in the veins, and in some cases they certainly penetrate the intestinal walls and reach the peritoneal cavity. Councilman thinks that the organism most commonly reaches the liver by means of the peritoneal cavity, by passing through the intestinal walls, and that once in the cavity they are carried, as are other foreign particles, up behind the liver. He does not regard with favor the idea that they reach the liver by means of the portal vessels. We must, however, regard the latter as the most probable channel of infection for the liver, both in the large, deep-seated abscesses, as well as in the widespread multiple small abscesses, which are all of about the same age and size. It is extremely improbable that amœbæ ever reach the liver by way of the lymph-channels, on account of the barrier offered by the lymphatic glands. Kruse and Pasquale suggest that amœbæ may reach the liver by the bile-duct and the bile-tract. This would explain the mode of origin of many of the so-called idiopathic abscesses.

It is not impossible that at least some cases of the idiopathic liver-abscesses are caused by amœbæ that have penetrated to the submucosa of the intestine possibly through small breaks in the mucous membrane or even through the unbroken mucous membrane, causing only slight local lesions, and, getting into the lumen of small veins, may reach the liver. Here, under more favorable conditions, possibly, than exist in the intestine, they may multiply and cause abscesses, while the process at the infection-atrium heals. Another possibility is the presence of one or more small amœbic ulcers in the rectum, colon, or cæcum, or even the small intestine or the stomach, which are too small and insignificant to cause diarrhœa or other symptoms. It is also very signifi-

cant that the "idiopathic" liver-abscess is most frequently met with in those countries and in those conditions in which the dysenteric liver-abscess is most common. There are numerous analogies in the pathology of the infectious diseases which support this explanation of the etiology and mode of origin of the idiopathic liver-abscess.

CLINICAL HISTORY AND DIAGNOSIS. Tropical abscess of the liver may run its entire course without giving any subjective symptoms that would attract the physician's attention to the liver, and, indeed, without causing the patient any great degree of suffering until shortly before the fatal termination.

Rouis says 15 per cent. and Chvostek says 25 per cent. of the cases are painless. Sachs¹ aspirated one and one-half quarts of pus from an hepatic abscess that had caused neither pain nor great inconvenience of any kind. Fayrer² reports a case of a young man in India, aged twenty-two years, who had slight chills simulating malaria; he also had diarrhoea and was anemic. The liver was large, not sensitive to pressure; no pain whatever. This condition lasted about six months, when one day, while boxing, he received a blow in the right hypochondrium, vomited a large amount of pus, and subsequently recovered his health.

A. S. Adams³ reports a case of a young soldier in India who died twelve days after admission to the hospital. He suffered no pain nor uneasiness in the liver region. The autopsy revealed a large abscess occupying the right lobe and another abscess occupying the left lobe of the liver, leaving only one-quarter of an inch of hepatic substance surrounding them.

Haspel (referred to in Bertrand and Foran's work) reports the case of a young soldier in the tropics who, suffering no inconvenience on the march, suddenly fell down and died in great agony from suffocation. A large abscess of the right lobe of the liver had broken into the right thoracic cavity.

Rouis reports the case of a soldier who had constantly reported for duty. The man was killed in a street row. The autopsy revealed a large abscess in the right lobe of the liver. Another case reported by Borius was that of a young soldier on the march in India, who died suddenly while kneeling down drinking from a spring at the roadside. At the autopsy it was found that a large abscess of the liver had ruptured into the peritoneal cavity.

It is also rather surprising that vomiting, icterus, and ascites are not more frequent accompaniments of the tropical abscess. The absence of vomiting is explained by the location of the abscess in cases originating

¹ Sachs: *Gaz. hebdomad. de méd.*, Paris, 1868, v. p. 214.

² Fayrer: *Brit. Med. Journ.*, London, 1871, ii. p. 401.

³ A. S. Adams: *Army Med. Dep. Rep.*, 1869, xl. 500.

from the amœba coli. The tropical abscess is located in the vast majority of cases at the superior and posterior portions of the liver, whereas vomiting is a frequent occurrence when the abscess is located in the posterior and inferior regions or in the lobus Spigelii or quadratus.

Absorption-icterus is rare in tropical abscess because of the location and manner of growth of the abscess. In the cases of abscess of portal origin icterus is relatively more frequent, and even then is probably rarely due to the contact of the abscess or suppurating portal vein with the radicles of the bile-duct.

From 115 cases of suppurative pyelephlebitis which we have collected from literature, only thirty had icterus. In reviewing the clinical histories of many of these cases it is noticed, however, that icterus followed severe vomiting and disappeared several days after the vomiting ceased, in spite of the fact that the suppurative pyelephlebitis went on to a fatal termination.

The location of the abscess also explains the absence of ascites in these cases, the inferior surface of the liver being rarely involved.

The involvement of the peritoneal covering of the liver causes severe pain on respiration, serving to inhibit diaphragmatic breathing, and gives rise to a physical sign which is often of great diagnostic value, viz., a friction that may be palpable as well as audible. The presence of a localized perihepatic friction-sound nearly always is due to one of two things—a gumma or an abscess. A friction-sound when heard between the eighth and tenth ribs in the axillary line is not always distinguishable from one of pleuritic origin. It has, too, been suggested that the friction-sound heard in this area (when caused by an abscess at the dome of the liver) originates from a secondary involvement of the pleural cul-de-sac, and is not due to perihepatitis; be this as it may, a friction-sound heard in this location has enabled the writer to detect the presence of an abscess when no other physical sign of abscess was present than a slight uniform enlargement of the liver. The location of this friction is of value also in determining the point for making an exploratory puncture.

Involvement of the phrenic nerve and the diaphragm is responsible for some of the most constant manifestations of hepatic abscess of amœbic origin.

The phrenic nerve takes its origin from the fourth cervical nerve and often has additional radicles from the third and fifth. Its branches supply the diaphragm, the capsule, and parenchyma of the liver. The right phrenic is the larger and penetrates the left as well as the right lobe of the liver. The phrenic nerve may be responsible for manifestations of irritation of the parenchyma of the liver, irritation or distention of its capsule or of the suspensory ligament, or inflammation of the diaphragm. Phrenic nerve irritation, besides the local pain,

often manifests itself in pain in the regions which are supplied by nerves having a common origin with the phrenic. The pain may be referred to the shoulder-joint, scapular, clavicular, or deltoid region, or to the side of the neck, or may even extend down the inner aspect of the arm and forearm. In 163 cases collected by Rouis, he found 28 with pain in the region of the shoulder. Of this number the pain was located in the shoulder-joint 23 times; subscapular and trapezius, 1; external end of clavicle, 1; shoulder and upper arm, 2; shoulder, scapula, and trapezius, 1. The pain lasted in most cases five or six days, and at times five or six months. In one case the referred pain preceded the local pain; in 14 it occurred simultaneously with it; and in 10 cases the shoulder pain commenced after the local pain had commenced.

The pain may be sharp, lancinating, or dull, or simply a sense of tension or fulness in this region. Good proof of ascending neuritis occurring from this source is a case reported by Rouis. A man, aged twenty-three years, had an hepatic abscess which opened externally in the epigastrium. Pain in the deltoid muscle was persistent during the existence of the abscess. After the rupture of the abscess occurred the pain ceased and atrophy of the muscle began. In six months after the abscess had opened the muscle had lost its form entirely.

Tussis hepatica is due (according to Leyden) to phrenic irritation; it may occur with abscess or gallstones, and may also be due to irritation of the liver substance or capsule, or diaphragm or pleura. Rendu had a case in a marine officer returned from Cochín-China, who had persistent cough and fever; tuberculosis of the lungs was suspected. After a few evacuations of stools consisting wholly of pus the cough stopped and did not return.

Hiccough is produced through the agency of the phrenic nerve, and may accompany irritation of the diaphragm or peritoneum; when it occurs in tropical abscess it is said to be evidence of beginning involvement of the diaphragm. Hiccough has been observed in dysentery, where neither diaphragm nor peritoneum was involved.

Diaphragm: the involvement of the diaphragm in tropical abscess has been noticed for many years, but a proper conception of the phenomena that result from it and their diagnostic interpretation is very sparingly treated in even the most recent monographs on liver-abscess. Malcolmson (*Med.-Chir. Trans.*, 1838) calls attention to the fact that the liver is enlarged upward when the abscess is at the dome. In the *Madras Quarterly Medical Journal*, 1844, a writer, in describing an autopsy on a case of tropical abscess, says: "The diaphragm was much attenuated and presented the appearance of a fine, transparent membrane, firmly adherent to the liver posteriorly and superiorly." It has been only within the last few years that clinicians have appreciated the

fallacy of the old explanation, viz., that the liver pushes the diaphragm upward. What really happens is this: the diaphragm loses its muscular activity through inflammation and atrophy, so that it no longer resists the elasticity of the lungs. The lungs retract and the diaphragm and liver follow upward, because of the intra-abdominal pressure. In Case II. the lower border of the liver ascended during the week the abscess was growing in size. This was explained at autopsy by the condition of the diaphragm.¹

When the diaphragm shares in the process there is another physical sign of considerable value, viz., the dyspnoea, which is rather objective than subjective. The patient may not be cyanotic, but the marked thoracic breathing and diminution of abdominal breathing present the same picture as seen in advanced cases of emphysema. The respiratory excursion of the ribs is very striking, and where there is a question of differential diagnosis between a process in the pleura at the base of the right lung and an abscess at the dome of the liver, the inconsistency between the strong thoracic breathing—*i. e.*, objective dyspnoea—and the extent of thoracic invasion should lead to an exploratory puncture for an hepatic abscess. In a case of bilateral pleurisy with effusion, in which three pints of fluid were withdrawn from each side of the thorax, the objective dyspnoea was not so great as in Case IV, long before rupture into the thorax had taken place.

¹ Since the above was written I have seen, in consultation with Dr. J. Friend, a young man, twenty-one years of age, who gave a history of having had several severe attacks of diarrhoea within the last two years, the last attack, a very severe one, occurring in the summer of 1896. He did not know whether his stools had contained blood or not. He has always lived in Cleveland. After the last attack of diarrhoea his health was relatively good until the latter part of December, when he complained of "a severe cold," with moderate cough and expectoration. For several days before seen by me the patient had repeated chills, followed by a temperature ranging from 99° to 103° and profuse sweating. There was moderate delirium at night. He complained of severe pain over the hepatic area in the axillary and mammary lines. His expectoration became profuse and blood-stained.

I saw the patient on January 2d, when he presented the appearance of a well-nourished and well-developed young man: there was slight cyanosis; the respirations were rapid, costal in character. The pulse was of moderate rate, fair volume, and well sustained. The heart was negative. The lower right thorax and hypochondrium were larger than the corresponding left side. The modified diaphragm-phenomenon—*i. e.*, the band of retraction without the pulmonary excursion—was plainly visible at the fifth rib in the axillary line on the right side, while on the left side the diaphragm-phenomenon, with relatively good pulmonary excursion, was visible at the seventh interspace in the axillary line. There was total absence of resonance and of respiratory sounds on the right side from the fourth interspace in the mammary line and from the fifth rib in the axillary line to the costal border. In the right axillary line from the fifth rib to the costal margin friction-sounds accompanying the respiratory movements were plainly heard. This same area was sensitive to pressure. The right lobe of the liver did not extend below the costal border. The spleen was not palpable, but percussion showed that the anterior border extended one and a half inches above the left costal border. The rest of the abdomen was not sensitive to pressure. There was considerable meteorism. There was abundant purulent expectoration, which was streaked with blood-pigment; was odorless. On microscopical examination no amœbæ, but a few bacteria, were found.

A diagnosis of hepatic abscess with rupture into a bronchus was made, and chloride of ammonium, ten grains six times in the twenty-four hours, was prescribed. In eight days the expectoration ceased, and on January 20th the patient was able to go about. I hear from Dr. Friend that the diaphragm-phenomenon of the right side is now visible at a point symmetrical with that of the left side.

The observation of the diaphragm-phenomenon as described by Litten¹ is also of value in such cases. In Case IV, the absence or rather diminution of this phenomenon on the right side and its presence on the left side were the points which led to the false diagnosis of neoplasm at the base of the pleura. No more striking example of this misleading sign can be found than the case of Du Pre,² where the incision was made in the fifth intercostal space in the axillary line, several litres of pus evacuated, and the supposed pleural cavity carefully washed out and drained. At the autopsy it was found that an enormous liver-abscess had been opened and that the pleural cavity was free from any inflammatory process.

In the more recent writings on this subject all writers agree upon a certain method of differentiating between the supra- and infraphrenic location of pus. A trocar for exploratory puncture is inserted; if pus flows out during inspiration, it is infraphrenic; if during expiration, it is supraphrenic or intrathoracic.

Dr. Ernst Jendrassik³ describes a case of subphrenic abscess which, according to his account, was certainly a tropical abscess at the dome of the liver. The question of diagnosis was between an empyema and subphrenic abscess. The pus flowed out during inspiration. During the operation manometric tracings of the pressure within the abscess-cavity were taken, and showed an increase of pressure with inspiration, which, of course, proved the infraphrenic location of the pus-cavity. This test is sufficient if the pus flows out during inspiration; but if the conditions be the reverse of this, the pus may still be infraphrenic. In Case II., at the time of operation, it was observed that the air rushed into the surgical opening during inspiration and the pus flowed out during expiration, quite the opposite of what we expected after having diagnosed a hepatic abscess with great certainty. The condition at the autopsy sufficiently explained the seeming contradiction. The muscular activity of the right side of the diaphragm was lost. The diaphragm was adherent to the liver posteriorly and superiorly—so firmly, in fact, that the two were removed together. The pleural cul-de-sac was obliterated. During inspiration the ribs were strongly elevated, thus diminishing the tension within the abscess-cavity, and the air rushed in; during expiration the ribs sank down upon the abscess-cavity, thus compressing it and expelling the pus.

The rôle this diaphragmatic involvement plays in respiration is seen in comparing Case IV. with the one cited by Bertrand and Foran, that of a young soldier on the march who died suddenly from rupture of a large hepatic abscess into the right thoracic cavity. The area of dia-

¹ M. Litten: Wiener klin. Wochenschrift, 1895, No. 5.

² Bertrand and Foran.

³ Jendrassik: Deutsche med. Wochenschrift, 1895.

phragm involved must have been very small, else the man could not have performed the duties of a soldier. In Case IV. the respiratory use of the right lung was largely sacrificed before the rupture occurred, so that when it did occur he was very little worse off so far as his respiration was concerned than he was before. The patient had gradually learned to accommodate himself to the loss of respiratory excursion of the right lung.

Urine: the study of the urine in hepatic abscess is very incomplete, and only very limited studies have been made by very few clinicians. In the light of former physiological teaching, great changes in the nitrogen metabolism were expected, and with this idea Dr. Parkes¹ attempted clinically to confirm his preconceived ideas. His deduction was that, owing to the destruction of a large amount of hepatic tissue in tropical abscess, the amount of urea must be diminished in proportion to the extent of hepatic destruction. Since the work of Ponfick² and Pody-sowsky, however, we know that as much as two-thirds of the liver of a dog may be removed before there is any disturbance in nitrogen metabolism. Dr. Parkes examined the urine of a man who had an abscess occupying nearly the entire right lobe of the liver. In six days the patient received 1152 grains of nitrogen in his food and eliminated 792 grains in the urine, leaving 43 per cent. unaccounted for. The condition of the alimentary tract is not taken into account, simply the nitrogen; none of its combinations was determined.

H. Cook, of Bombay, estimated the urea (Liebig's method) in twenty-one cases of tropical abscess. The amount varied from 42 to 340 grains. These results are very unsatisfactory, as nothing but the urea was determined, and the quantity of nitrogen consumed in the food and eliminated through the intestine was wholly ignored.

Bertrand and Foran claim to have proved the law of Parkes. Their examinations are equally incomplete. One case, however, they report disproves their own argument. In one man the urea had descended to 1.5 grammes in twenty-four hours, at a low body-temperature. Then the temperature rose to 104.5° and the amount of urea eliminated in twenty-four hours rose to 17 grammes, showing that the urea-producing organs were still equal to their task.

In the case of Du Pre, which was operated for empyema and in which at the autopsy there was found scarcely any hepatic tissue left because of the enormous abscess, "the urine was examined by Prof. Bechamp, who, to his great astonishment, could not detect the presence of any urea." Any further chemical analysis is, however, lacking. In Case IV. analyses of the urine were made which show that two-thirds of the liver may be occupied by an abscess and still the nitrogen metabolism be un-

¹ Trans. Med. and Phys. Soc., Bombay, 1876, xii. 17.

² Ponfick: Virchow's Archiv, 1894.

disturbed. In this case no attempt was made to restrict or determine chemically the diet of the patient, nor was any estimate made of the nitrogen in the stool. The twenty-four hours urine was collected, and the total nitrogen estimated by Kjeldahl's method; the urea by decomposing with hypobromite of sodium, and the resulting nitrogen measured over water, making barometric and thermometric corrections. The ammonia was determined by Schlösing's method as recommended by Neubauer and Vogel; the uric acid by precipitating as ammonium urates with ammonium chloride, dissolving and precipitating as pure uric acid with hydrochloric acid; then titrating it in solution against a known solution of permanganate of potassium. With this method, however, the nitrogen of ammonia is reckoned twice: first, it is decomposed by the hypobromite in estimating urea, and, second, when ammonia as such is determined.

Date.	Amount.	Reaction.	Specific gravity.	Total amount of nitrogen.	Urea.	Nitrogen in urea.	Uric acid.	NH ₃ .
	C.cm.			Grms.	Grms.	Grms.	Grms.	Grms.
July 20th,	840	Acid	1024	13.282	28.0	13.066	0.686	0.8
July 29th,	900	Acid	1020	10.584	20.0	9.32	0.524	1.0
August 5th,	1360	Acid	1013	9.52	15.382	7.158	0.504	0.8

The patient gradually eliminated a smaller amount of urea, but it was because he was eating less and less food—starvation.

TREATMENT. Sachs¹ describes a case of tropical abscess that recovered spontaneously and without rupture. Bertrand and Foran describe a case that was treated surgically and recovered, but later succumbed to another attack of dysentery. At autopsy the scar of the abscess treated surgically was found, but still deeper in the liver-substance and separated from it by normal liver-tissue was a mass the size of a walnut with a thick indurated wall, containing a white creamy substance which proved to consist of calcareous matter and fat, the remains of the abscess that healed spontaneously. Rupture into some neighboring cavity or organ is a very frequent *dénouement* of hepatic abscess. One course, however, merits some consideration, and that is rupture into and expectoration through the right lung. The relative good prognosis in such cases has long been recognized. John Jackson, in the *London Lancet*, 1845, says: "Long experience has convinced me that there is no course which hepatic abscess (when once formed) can take which holds out such good prospects of recovery by natural means as when the channel for the discharge is through the right lung."

Jean L. Morvan (*Thèse de Bordeaux*, 87-88) reports five cases, four

¹ Sachs—Arch. f. klin. Chirurgie, 1876, vol. XIX.

of which were expectorated through the right lung and recovered. Brichiteaux (Paris, 1852) reports three cases that recovered after expectorating through the lung. Ughetti collected 131 cases, forty-eight of which were not operated, and 76 per cent. died; forty-five were operated, and 42 per cent. died; thirty-eight broke through the lungs, and 14.6 per cent. died. Sachs reports a case that expectorated only one ounce of pus and recovered. These experiences of other men should make the therapist in cases of suppurative hepatitis very conservative in accepting the value of any medication in the disease.

Dr. Sachs, a German physician in northern Africa, says a Dr. Ori (an Italian physician who had travelled in the Soudan) told him that the natives of that country frequently have hepatic abscesses and operate themselves by opening the abscess with a two-edged knife known as the "chotal." Dr. Ori says they frequently recover when adhesions have been formed between the abdominal parietes and the liver; otherwise they die with peritonitis.

Stewart, an Englishman in the Indian service (London *Lancet*, 1870) says the "Hakeems" of that country treat hepatic abscesses with some success by applying the cautery over the area. Some English writers have applied nitrate of silver over an abscess of the liver to aid the pointing, and, to their surprise, the abscess disappeared entirely. The credit for having made the first free-drainage with stitching the liver to the abdominal wall is accorded William Horner, of Philadelphia, in *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, 1834. A diagnosis of hepatic abscess was made and Horner determined to operate. An incision was made at the costal border at the eighth rib, but no adhesions had formed. "In this dilemma I determined to stitch the liver to the side, which was accomplished with a large crooked needle, armed with a ligature of kid-skin and of bulk sufficient to fill up the hole made by the needle. One stitch was made in this way parallel with the upper margin of the incision at the distance of four lines from it and another in the same manner below." Drainage was established by introducing a trocar and allowing it to remain fifty-four hours, then substituted it with a piece of flexible catheter. The patient died on the fourth day. There was no peritonitis.

The surgical treatment is fully discussed in all the monographs on hepatic abscess; the more recent ones, "Langenbuch" and "Bertrand and Foran."

The medical treatment of hepatic abscess has offered very little. Besides the irrigation of the colon with a solution of quinine or of tannic acid during the time of the dysentery, and the administration of calomel and ipecac during the suppurative stage of the hepatitis, there has been little claimed for any therapeutic measure. One therapist, however, has been completely ignored by later writers, and unjustly so if the good

results of his treatment are in any degree commensurate with his claims for it.

William Stewart, an army surgeon in the English army in India, published his first article on the subject in the London *Lancet*, 1870. In this article he says that chloride of ammonium had long been in use among the Germans and French for hepatitis when the English used calomel. He describes ammonium chloride therapeutically as a diuretic, diaphoretic, and anodyne. The descriptions of his cases from a diagnostic standpoint are not convincing that it was always hepatic abscess he was dealing with. L. G. Alexander, of Calhoun, Ky., describes a case that he had treated a year before Stewart's publication. The clinical description of the case is fair and rather convincing as to the correctness of the diagnosis (though no exploratory puncture was made). The patient recovered in twenty-three days after commencing the ammonium chloride treatment. One thing, however, is noticeable in the clinical history of the case, and that is, simultaneously with the commencement of the use of ammonium chloride the expectoration increased largely in quantity. The possibility of rupture and expectoration through the right lung was not considered by the author.

In 1879 Stewart published an 8vo. 100-page monograph on the "Treatment of Tropical Abscess with Ammonium Chloride." He describes the remedy as a specific for tropical abscess of the liver. The patient is put to bed and given as much as 20 grains three or four times a day. In from five to twenty minutes the patient has a feeling of "pins and needles," a sense of warmth, "tearing or pulling," "something gave way," in the right hypochondrium. In some cases the pain or shock would come so suddenly that the patient would cry out. The amount of urine soon increases, the fever diminishes, and the diaphoretic and anodyne action of the drug is apparent. An unfortunate feature about Stewart's cases is that he never proved the presence of pus in a single case by exploratory puncture. Nevertheless, he describes the cases that had enlarged liver, fluctuation, and other clinical signs of liver-abscess that recovered under his treatment.

In one case ammonium chloride was administered where liver-abscess was not suspected; the characteristic symptoms following its use led to the detection of a liver enlarged from the presence of a tropical abscess.

One case of a soldier was treated successfully for liver-abscess. He performed his military duties for two years afterward, when he died from sun-stroke. At the autopsy a large puckered scar was found at the dome of the liver where the abscess of two years before was located. Stewart adduces further evidence in the statistics of an English regiment serving seven years in the same and different portions of India. From 1865 to 1869, without the use of ammonium chloride, there were 28

deaths from liver-abscess. From 1869 to 1872 there were 16 diagnoses of liver-abscess and not a single death from the same cause.

In 1889 G. Harrison Younge, of the Indian service, says that ammonium chloride has done valuable service in the military hospitals, as described by Stewart.

In 1891, in the London *Lancet*, Stewart again offers further evidence of the value of ammonium chloride in the treatment of liver-abscess.

In spite of the incomplete clinical account of Stewart's cases, the fact that an English regiment could serve three years in India without a single death from hepatic abscess justifies at least a fair trial of the remedy, which can certainly do no harm.

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A CASE OF TOXIC AMBLYOPIA,

WITH AUTOPSY AND MICROSCOPICAL EXAMINATION OF THE SPECIMENS.¹

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 OF PHILADELPHIA.

ALTHOUGH von Graefe, Leber, and Förster surmised that central scotoma was, under certain circumstances, a symptom of lesion of the optic nerve, absolute proof of this belief was not reached until 1880, when Samelsohn published his researches on the pathological anatomy of retrobulbar neuritis (central amblyopia). True, some earlier observations (Erisman, in 1867, and Leber, in 1869) are on record, but, as Uthoff has observed, their cases were not pure examples of intoxication-amblyopia, and, therefore, Samelsohn has the credit of publishing the first well-studied case of this affection which came to autopsy. Since the date of this paper the literature has been enriched by the description of about twenty additional post-mortem and microscopical examinations of intoxication-amblyopias; but even now there is not perfect accord with reference to the exact pathological anatomy of this interesting affection, and hence no excuse seems necessary for the record of a new case.² It is as follows:

¹ Read before the American Ophthalmological Society, in Washington, May, 1897.

² In the following list are the references to the most important papers describing the lesions in intoxication-amblyopias based upon microscopical examination:

1. Samelsohn: Graefe's Archiv, 1882, xxviii., Abth. 1, pp. 1-110.
2. Vossius: Ibid., xxviii., Abth. iii., p. 201.
3. Nettleship and Edmunds: Trans. Ophth. Soc. of the U. K., 1881, i., p. 121.
4. Bunge: Ueber die Gesichtsfeld und Faserverlauf im Optischen Leitungs-Apparat. Halle, 1884.
5. Thomson: Archiv f. Psychiatrie, xiii., p. 352.
6. Uthoff: Graefe's Archiv, 1886, xxxii., Abth. iv. 95-108, and Ibid., xxxiii., 1, pp. 257-318.
7. Wildbrand: Bericht über die Versammlung der Ophthalmolog. Gesellschaft, xxii., Heidelberg, 1892, p. 84.
8. Sachs: Archives of Ophthalmology, 1889, xviii., No. 2, pp. 133-162, and Ibid., 1891, xxiii., No. 4, pp. 296-344.
9. Stoltzing: Klinische und Anatomische Beiträge zur Intoxications-amblyopie, Inaug.

M. T., aged sixty years, born in Ireland, widower, a messenger in the Philadelphia Hospital, consulted me first in the spring of 1895, with the hope of obtaining relief for failing vision.

History. With the exception of frequent attacks of facial neuralgia, the patient had been for many years a reasonably healthy man. He had been an inmate of the hospital for thirteen years, during the last nine of which he had been employed as a messenger in the Training School. According to the rules of the institution, once in two months he was given leave of absence lasting twenty-four hours. He always returned on time, and although it is probable he was not an abstainer during these holiday hours, he was never known to be intoxicated. While within the walls of the hospital it was not possible for him to obtain liquor. Previous to his entrance into the hospital he kept a saloon, and no doubt drank liquor, but there is no history of alcoholic excesses. For a number of years he had smoked excessively; indeed, he was seldom without a pipe in his mouth. He drank tea freely. There was no history of venereal disease and no signs of its influence. For a year before his death there was distinct evidence of physical failure. He suffered much from headache, and the urine was known to contain albumin. The vision of each eye had been poor for some months before he reported for treatment, and he was driven to seek advice because of his inability to read the newspaper.

Examination. The patient was a tall, well-preserved, and, at that time, an apparently healthy man. His radial and temporal arteries were rather hard, and the pulse showed high tension. The urine was not examined on this date, but subsequently—*i. e.*, about eighteen months later—it was found to contain albumin and casts. Sugar was not present.

Eyes. V. of R. E. equalled 5/60, and was unimproved by a glass. The ophthalmoscope revealed H. of 2 D., a vertically oval, rather pallid disk, the temporal side being paler than the general surface. The vessels were of normal size; there were no retinal or choroidal lesions. The nucleus of the crystalline lens was hazy. The peripheral form-field was normal, but there was a central scotoma for red and green. The pupil-reactions were normal.

V. of L. E. equalled 5/40, unimproved by a glass, and ophthalmoscopically the same conditions were present as those on the right side. The form-field was normal and there was a central color-scotoma, somewhat smaller than on the right side. The lens was hazy; the pupil normal.

The patient was advised to discontinue the use of tobacco, and was ordered strychnine. It is probable that he tried to follow this advice, but with indifferent success, and practically he did not stop the use of tobacco until his final illness. His eyes were examined from time to time, and the conditions already described remained unaltered.

The fields of vision in the early fall of 1896 are represented in the accompanying diagrams, *viz.*: O. D. a normal form-field, contracted

Dissert., Marburg, 1893. This thesis contains abstracts of all microscopical examinations in cases of toxic amblyopia up to date of its publication.

10. Nuel: Archives d'Ophthalmologie, October, 1895; March and August, 1896.

11. Schmidt-Rimpler: Bericht über die Versammlung der Ophthalmolog. Gesellschaft, xxv., Heidelberg, 1897, p. 99.

In addition to the cases referred to above, fifteen in number, there have been about six others, notably those of Leber, Erisman, Magnan, and Bidecker. Schmidt-Rimpler's paper describes especially diabetic amblyopia.

blue and red fields, loss of the perception of green, and a large central scotoma extending somewhat beyond the limits usually seen in the earlier stages of intoxication-amblyopia, and probably reaching the limit of the red field above; O. S. a normal form-field, moderate contraction of the blue and red fields, green blindness, and a typical central scotoma, 20 degrees outward, 7 degrees upward, 6 degrees downward, and about 5 degrees inward. (Figs. 1 and 2.)

On December 7, 1896, the patient was taken suddenly ill and rapidly developed pneumonia, with uræmic symptoms. The urine contained albumin and granular and hyaline casts. Stupor supervened, and death occurred on the third day.

FIG. 1.

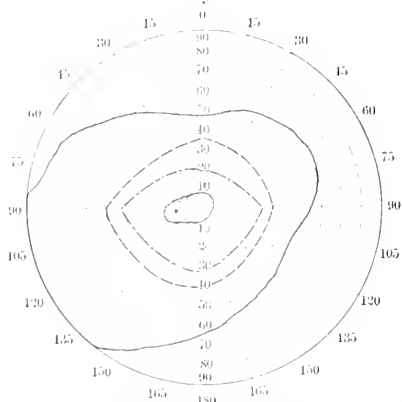
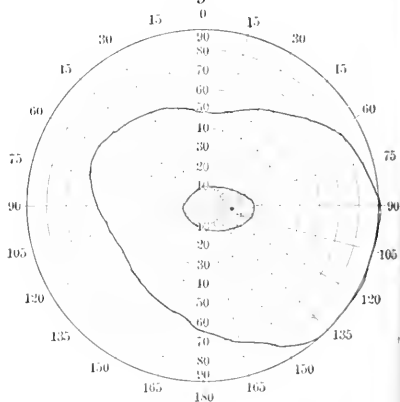
Left

FIG. 2.

Right

The continuous line indicates the limits of the form-field; the broken lines the color-fields, — — — blue; — · — · — red; the central cross-hatching the scotomas. There was green blindness. It was difficult to ascertain the limits of the color-fields of the right eye; they are, therefore, not represented. The limits of the scotoma were also difficult to determine; they probably reached the boundary of the red field above.

The test-objects were white and colored circles, one em. in diameter. The scotomas were determined with $\frac{1}{4}$ cm. square colored tests.

The autopsy was made sixteen hours after death. Permission to open the skull-cap only was obtained, and the posterior halves of the eyes, together with the optic nerves, chiasms, and tracts, were removed and placed in Müller's fluid. With the exception of œdema of the pia-arachnoid there were no abnormalities of the brain or cerebellum. After six weeks' hardening in frequently changed Müller's fluid, kept at a temperature between 60° and 70° F., serial sections of the optic nerves, chiasms, and tracts were cut and stained according to the Weigert and Weigert-Pal methods. Longitudinal sections of the posterior halves of the eyeballs were similarly cut and stained. For the study of the histological details the carmine method was employed. For the preparation of these sections I am greatly indebted to Dr. J. Dutton Steele.

1. *Longitudinal section of the posterior half of the right bulb and 5 mm. of the optic nerve.* (Weigert and Weigert-Pal stain.) The degenerated area occupies strictly the temporal half of the nerve and passes

PLATE I.

FIG. 1.

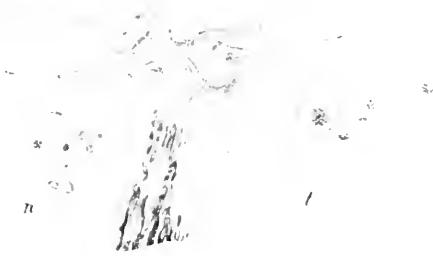


FIG. 2.



FIG. 3.



FIG. 4.

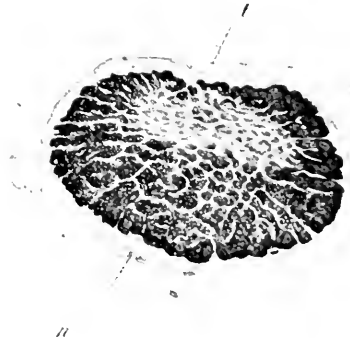


FIG. 5.

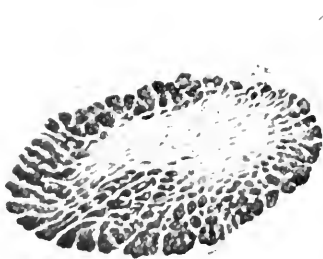


FIG. 6.



PLATE II.

FIG. 1.



FIG. 2.

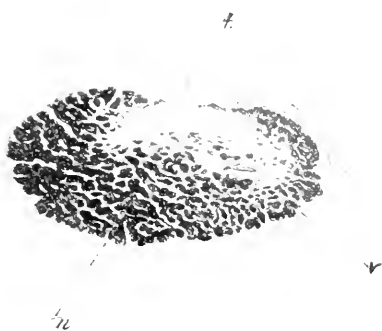


FIG. 3.



FIG. 4.

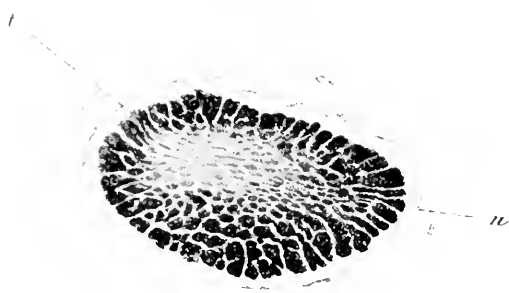


FIG. 5.

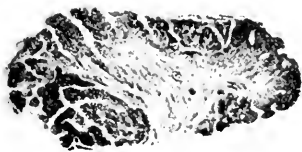


FIG. 7.



FIG. 6.





to the pial sheath. Close to the lamina the degeneration is complete; further onward are traces of normal nerve-fibres. (Fig. 1, Plate I.)

2. *Transverse sections of right nerve 8 mm. behind the globe.* The degenerated patch occupies the temporal (lower and outer) portion of the nerve, forming a somewhat heart-shaped area, extending at one point to the sheath. This area is imperfectly divided by a faint line of partially preserved nerve-fibres. (Fig. 2, Plate I.)

3. *Transverse section of nerve 13 mm. behind the globe.* The degenerated patch, still occupying the lower and outer part of the nerve, becomes more contracted and assumes an oval or somewhat meniscus-like shape. (Fig. 3, Plate I.)

4 and 5. *Transverse section of nerve in the region of the optic foramen.* The degenerated patch tends to leave the periphery and pass to the centre, although still somewhat eccentrically placed. (Fig. 4, Plate I.) Further onward it is still more centrally placed, with the broader end toward the outer border. (Fig. 5, Plate I.)

6. *Transverse section of nerve in the intracranial region.* The degenerated patch is somewhat crescentic and with the broader end toward the temporal side. It occupies a position somewhat above the centre of the nerve. (Fig. 5, Plate I.)

1. *Longitudinal section of the posterior half of the left bulb and 8 mm. of the optic nerve.* (Weigert and Weigert-Pal stain.) The degenerated area again strictly occupies the temporal half of the nerve and passes to the pial sheath. Close to the lamina the degeneration is almost complete. Further toward the brain patches of retained nerve-tissue are seen. If the patch is studied in its relation to the vessels, it is seen in certain sections to occupy a somewhat triangular patch which, in cross-section at this point, would produce the well-known wedge-shaped patch with the apex toward the vessels, which has so often been described. (Fig. 1, Plate II.)

2. *Transverse section of the left nerve 10 mm. behind the globe.* The degenerated patch forms a crescentic or somewhat meniscus-like area with its concavity toward the vessels and reaching at its outer border quite to the pial sheath. It is divided by a distinct line of retained normal nerve-fibres, the line running in the long axis of the patch. (Fig. 2, Plate II.; compare with Fig. 3, Plate I.)

3 and 4. *Transverse sections of the nerves in the neighborhood of the optic foramen.* The degenerated patch again tends to leave the periphery and reach the centre (Fig. 3, Plate II.; compare with Fig. 4, Plate I.), which it more nearly attains at the foramen (Fig. 4, Plate II.; compare with Fig. 5, Plate I.), its broadest end being toward the temporal side. The remainder of the nerve to the chiasm tallies closely with that upon the right side, as does also the appearance of the optic tract. Therefore figures and descriptions need not be reproduced.

5. *Transverse section of the right nerve just in advance of the chiasm.* The section is somewhat broken, but shows the degenerated patch occupying an irregular area in the centre of the section, and reaching below to its margin. (Fig. 5, Plate II.)

6 and 7. *Transverse section of the chiasm and optic tracts.* The degenerated patches occupy symmetrical positions in either end of the ellipse, being nearly centrally placed and gradually narrowing to a point of decussation in the centre of the chiasm. (Fig. 6, Plate II.) In the optic tract the degenerated area at first occupies almost exactly the centre of

the tissue, and becomes less and less marked as the connection between this tissue and the mid-brain is being formed. (Fig. 7, Plate II.)

The degeneration has attacked that portion of the optic nerve ordinarily known as the papillo-macular bundle, or the macular fascicle. It pursues a course similar to the one already described by Samelsohn, Vossius, Uthoff, and other observers, beginning in a wedge shaped area of degeneration on the temporal side of the optic nerve, which position it maintains, although in a somewhat altered shape, being at first heart-shaped and later crescentic, for about 10 mm. behind the globe. The area then approaches but never quite reaches the centre of the nerve, and maintains this position until it reaches the foramen. In the intracranial portion of the nerve the patch again becomes distinctly crescentic and occupies a position above the centre. In the chiasm the foci of degeneration are symmetrically placed slightly below the centre, while in the tract the position is almost exactly central.

Examination of the diagrams and slides further indicates, first, that the process was more intense and the degeneration more pronounced upon the right side than upon the left side. This corresponds with the visual field examination, which showed a larger scotoma upon the right side and a greater loss of color-perception, with the production of spots of absolute scotoma. Second, that the degeneration both upon the right and left sides is more marked in two situations, namely, just posterior to the lamina cribrosa, and again at the optic foramen, although just before reaching this point there is an area with well-preserved patches of nerves. (See Fig. 4, Plate I.; Fig. 4, Plate II.)

FINER MICROSCOPICAL DETAILS. 1. *The Retina.* The retinal elements, with the exception of the optic-nerve fibre-layer and the ganglion-cells, may be dismissed at once, because they present no abnormalities of interest in the present discussion. The nerve-layer, especially as the fibres approach the papilla on the side corresponding to the degeneration in the temporal half of the optic nerve, is narrower than normal, although it is to be remembered that the fibre-layer is naturally less developed in the temporal than in the nasal retina. The contraction of this layer under similar circumstances has been noted by Bödecker and other observers.

The *ganglion-cells* are normally placed and are not numerically decreased. Comparing them with those of a retina known to be healthy, they appear in the neighborhood of the nerve-head to be small and the development of their processes imperfect, a phenomenon which has also been observed by Sachs. In the macular zone, however, there is the usual increase in the number of ganglion-cells, which are well constituted, *exhibiting neither atrophy nor degeneration.*

The coats of the *retinal vessels* are greatly thickened, a thickening quite in accord with arterial change elsewhere in the ocular tissues.

2. *The choroid* is practically free from changes, save those referred to in the vessels.

3. *The optic nerves.* The trabeculæ of the laminae are thickened and compressed, and the vascular septa of nerve (in cross-section) generally thicker than under normal conditions. The nerve-fibres surrounding the patch of diseased tissue, situated as already described, present a normal appearance. As the lesion is approached there are an augmentation of nuclei, a marked thickening of the connective-tissue septa, and a disappearance and degeneration of the nerve-fibres. The diseased patch is sharply separated from its normal surroundings.

4. *The vascular changes* have been described in general terms. In particular it may be said that the small nutrient vessels of the optic nerve are greatly thickened—so greatly that in many places they are practically converted into small fibrous cords. The same changes are manifest in the walls of the major vessels, and, moreover, not only in those supplying the retina and optic nerve, but in others which happen to be shown in the tissues outside of the dural sheath of the nerve. The *vena postica*, which has been particularly described by Sachs as giving evidence of an endo- and periphlebitis, could not be identified in any of the sections.

Briefly, then, the changes in this case of central scotoma, which, so far as the history and the perimetric examinations are concerned, seems to belong to the group of the so-called intoxication-amblyopias, are: degeneration of the papillo-macular bundle from the tract, through the chiasm and along the nerve until it reaches the nerve-head; marked thickening of the connective tissue of the affected area, with degeneration of the nerve-fibrils, and hypertrophy of the walls of vessels, associated with a moderate increase in nuclei within the fasciculi; some narrowing of the temporal nerve-fibre layer in the neighborhood of the papilla, and in the same region imperfections in the processes of the ganglion-cells, which, however, in the macular zone are of normal construction.

With reference to the pathological process present in the optic nerve in cases of this description, there is some difference of opinion, and, as has been well stated, “the descriptions of the optic nerves in the recorded cases agree quite as well with an inflammation of the connective tissue of the nerve causing secondary atrophy of the nerve-fibres as with a primary atrophy of the latter associated with secondary interstitial changes following in its track.” The same doubt obtains in the present instance, although taking into consideration the marked thickening of the interfascicular septa, the vascular changes and the increase in the nuclei, both upon the edge of the degenerated area and within the fasciculi, even if this increase in nuclei cannot be said to be a marked one, the appearances correspond closely with those usually assigned to an

interstitial sclerosing inflammation, which Samelsohn compared with the same pathologic process visible in interstitial hepatitis.

As my specimens show extensive typical tract-atrophy far advanced, and the retinal sections from the same case only a moderate thinning of the nerve-fibre layer on the affected side, without any special change in the ganglion-cells, which, indeed, in the macular zone appear practically unaltered, it is difficult to assume that these cells should be regarded as the starting-point of this affection. In other words, this case fails to confirm the recent contention of Nuel,¹ that central toxic scotoma is not primarily a neuritis of the macular bundles, but a disease of the macular lutea causing degeneration of its cells, and that the optic-nerve changes are secondary to the destruction of the nerve-cells of the macula. To be sure, there is no manner of doubt that macular-fibre degeneration will follow experimentally produced retinal lesions, as has been shown in the excellent research of Usher and Dean,² and clinically we know that atrophy of the tissue of the macula lutea, for example, in atrophic central retino-choroiditis, or in so-called macular coloboma, will cause quadrant-atrophy of the optic disk, precisely as this is seen in cases of intoxication-amblyopia. If a specimen of this character were submitted to microscopic examination, I have no doubt atrophy of the papillo-macular bundle would be found precisely as it appears in the present instance.

Ophthalmoscopic changes in the macula have been described in cases of toxic amblyopia by Nettleship, Hill-Griffith, and myself; although we did not attribute them to the influence of a toxic agent, but regarded them as coincidences. Macular changes have also been described by Nuel and W. G. Laws, but they are quite as indefinite as those previously recorded.

Nuel has experimentally produced optic-nerve degeneration by administering extract of male fern, and thinks that this disease attacks first the nerve-cells of the retina, and that their destruction brings about the degeneration of the fibres of the optic nerve. Moreover, this degeneration occurs without the intervention of a neuritis. Recently the same author,³ in a discussion on sympathetic amblyopia, refers to this subject (I quote W. G. Sym's abstract of his paper) as follows: "In a certain number of cases of filix mas amblyopia in dogs there is a distinct degree of neuritis, or at least of blurring of the papilla; but, microscopically, there is no trace of an interstitial neuritis, only an œdema of the nerve-head. This interstitial œdema is consecutive to the destruction of the

¹ Archives d'Ophthalmologie, October, 1895; March and August, 1896. The macular origin of central scotoma was advocated more than twenty years ago by Schoen, and later by Bayer and Treitel, who believed that it indicated a functional weakness of the centre of the retina due to toxic agents.

² Trans. of the Ophth. Soc. of the U. K., 1896, vol. xvi, p. 218.

³ Archives d'Ophthalmologie, March, 1897.

nerve-fibres, and real neuritis, if it occurs, comes on later, but is neither interstitial nor retrobulbar. Many cases of toxic amblyopia are of this nature; they are instances of parenchymatous neuritis." In my own experiments in quinine-amblyopia¹ the extensive degeneration of the whole visual tract which followed the administration of this drug occurred without preceding neuritis.² It was essentially a degenerative process, but, as an examination of my specimens will show, there were no changes in the ganglion-cells of the retina. Therefore, while there may be a retinal origin of degeneration of the papillo-macular bundle, or, indeed, of more extensive disease of the entire nerve, it evidently is not the usual or constant starting-point of this lesion in so-called intoxication-amblyopias. Certainly, degeneration of the ganglion-cells could not have been the cause of the atrophy of the macular fascicle in the present case, nor in several others which have been reported, notably those of Sachs, who, like myself, carefully examined the ganglion-cells of the macula and found them normal. Neither can disease of these cells be held responsible for the atrophy of the optic nerve which occurs in quinine-toxæmia, if I may judge from the examination of a large series of sections in which no notable changes in the ganglion-cells can be demonstrated.

In quinine and salicylic-acid amblyopia, and as I expected I would find in filix mas amblyopia, but I was not successful in securing atrophy, the primary changes are vascular, sometimes, in the earlier stages, of the nature of a pure ischæmia, and later, if the influence of the poison continues, these functional vascular changes, if I may so express myself, become organic ones. Endovasculitis, thickening of the vessel-walls, etc., appear, associated with degeneration and atrophy of the nervous tracts which they supply.

Sometimes a single tract is attacked, as in the tobacco- and alcohol-amblyopias, and, again, an entire nerve, as in quinine-amaurosis. Why certain tracts or areas are affected to the exclusion of others, we do not know. Perhaps the process depends upon nutritional disturbances similar to those which occur in certain tracts of the cord in pernicious anæmia, and which subsequently develop into atrophies resembling those seen in locomotor ataxia.

The belief of Sachs, that the earlier stages of these intoxication-amblyopias must be sought for in vascular disturbances, has a good deal to recommend it, and seems borne out by the action of other toxic

¹ The Toxic Amblyopias; their Classification, Symptoms, and Pathology. Philadelphia, Lea Bros. & Co., 1896, pp. 193-198.

² In my earlier experiments in quinine-amaurosis (Trans. Coll. of Phys. of Phila., 1890) I found in many sections, in the earlier stages of the blindness, "that the trabeculæ were less marked and the individual fibrils spread apart, as if the tissue was cedematous and swollen." This observation is similar to the one made by Nuel in dogs suffering from the amblyopia of male fern.

agents. What exactly is the active principle which produces these nutritional disturbances we do not know. Sometimes it is tobacco, sometimes tobacco and alcohol combined, sometimes it is other poisons, as opium, hashish, iodoform, etc., and sometimes it is a toxin, as, for example, the toxin of diabetes. I have long ago contended that I did not believe it was tobacco alone, or its active principle, nicotine, which was the essential poisonous agent, but that one or more of the many principles freely present in tobacco-smoke, or some toxic influence which they liberate in the system, must be held accountable for the disease. Sachs contends that even in the tobacco cases certain complex chemical combinations occur in the stomach, and there is a resulting transformation of the normal gastric juices into acids of the fatty type which combine with nicotine to form substances which are more injurious than the simple tobacco-bases themselves. Experimental work now being carried on in Chicago under the direction of Dr. Casey Wood indicates that certain stomachic toxins are capable of causing in animals blindness, probably of the type under consideration.

UREA-ESTIMATIONS IN CASES OF TYPHOID FEVER TREATED BY THE BRAND-BATH METHOD.¹

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E. B. C., a bookkeeper, aged twenty-five years, was admitted to the hospital of the University of Pennsylvania, December 25, 1896. His family and personal history had no bearing on his existing illness, which began apparently on December 17th with a severe backache. He had headache also two days earlier, but this disappeared and did not return. On the 21th, the day before admission, diarrhea set in, he having previously been constipated. On this day, too (the 24th), he had a small epistaxis. There had been some cough for several weeks. On admission at 3.30 P.M. his temperature was 102.8° F. At 8.30 in the evening it was 103.8° F. His tongue was slightly coated, but not dry; his belly somewhat distended. The spleen was decidedly enlarged, but there were no rose-colored spots on that day. These were unmistakably present on the 28th. On the day of admission the urine was examined and a small albuminuria found. To this were added, on the 27th, hyaline casts. The diagnosis of typhoid fever seeming sufficiently justified, tubbing at 102.2° F. was commenced on the 27th. The effect upon the temperature was prompt, lowering it from 104.4° to 98.4° F., at the fourth bath, received at 11.45 of the 28th. On this day a copious purulent expectoration, tenacious and bloody, was noted, containing also numerous diplococci, but the physical signs of a croupous pneumonia

¹Read before the Association of American Physicians at its meeting in Washington, May, 1897.

could not be elicited. The albuminuria on this day had increased to one-fourth bulk, and hyaline casts were numerous.

We were not deterred from tubbing by these symptoms, though the bronchitis was deep-seated. Indeed, there was probably a broncho-pneumonia. It was thought that this would be a suitable case on which to make a study of the urine. The diet was the usual liquid diet of typhoid fever, wholly milk.

We began to collect the urine on the 29th, when but eleven ounces and a half were gathered, representing a part only of the twenty-four hours' quantity. This contained 2.9 per cent. of urea. The daily amount was measured and the urea estimated daily for a month succeeding, until convalescence was thoroughly established. The results are:

<i>Quantity</i>			<i>Urea.</i>	
December 30, 1896	24 oz. (720 c.c.)	2.52 per cent.	18.32 + gms. (283.72 grains.)	
" 31, "	40 " (1200 ")	2.65 "	32.11 + " (495.60 ")	
January 1, 1897	48 " (1440 ")	2.14 "	20.46 + " (480.00 ")	
" 2, "	66 " (1980 ")	1.64 "	32.80 + " (506.22 ")	
" 3, "	56 " (1680 ")	1.89 "	31.98 + " (494.43 ")	
" 4, "	60 " (1800 ")	1.77 "	32.16 + " (496.20 ")	
" 5, "	45 " (1350 ")	1.77 "	24.76 + " (382.15 ")	
" 6, "	44 " (1320 ")	2.14 "	28.61 + " (440.90 ")	
" 7, "	52 " (1560 ")	1.64 "	25.84 + " (398.84 ")	
" 8, "	32 " (960 ")	1.51 "	14.57 + " (225.93 ")	
" 9, "	48 " (1440 ")	1.89 "	27.33 + " (421.84 ")	
" 10, "	48 " (1440 ")	1.51 "	21.96 + " (338.88 ")	
" 11, "	68 " (2040 ")	2.14 "	44.07 + " (680.00 ")	
" 12, "	40 " (1200 ")	2.52 "	30.53 + " (471.20 ")	
" 13, "	38 " (1140 ")	2.14 "	24.62 + " (380.00 ")	
" 14, "	62 " (1860 ")	1.89 "	35.48 + " (547.46 ")	
" 15, "	41 " (1320 ")	2.52 "	33.59 + " (518.32 ")	
" 16, "	64 " (1940 ")	1.89 "	36.49 + " (563.12 ")	
" 17, "	42 " (1260 ")	1.64 "	20.81 + " (321.14 ")	
" 18, "	48 " (1440 ")	1.64 "	23.86 + " (368.16 ")	
" 19, "	48 " (1440 ")	1.64 "	23.86 + " (368.16 ")	
" 20, "	56 " (1680 ")	1.89 "	31.98 + " (494.48 ")	
" 21, "	68 " (2040 ")	1.51 "	31.11 + " (480.08 ")	
" 22, "	66 " (2080 ")	1.51 "	30.45 + " (465.96 ")	
" 23, "	30 " (900 ")	1.39 "	12.63 + " (195.99 ")	
" 24, "	42 " (1260 ")	1.64 "	13.03 + " (201.00 ")	
" 25, "	70 " (2100 ")	1.51 "	29.87 + " (460.92 ")	
" 26, "	70 " (2100 ")	1.39 "	21.76 + " (382.15 ")	
" 27, "	76 " (2280 ")	1.51 "	32.11 + " (495.60 ")	
" 28, "	76 " (2280 ")	1.51 "	32.11 + " (495.60 ")	

<i>Albumin.</i>			<i>Albumin.</i>	
December 29, 1896,	a one-quarter bulk.		January 4, 1897,	a one-tenth bulk.
" 30, "	" "	" "	" 5, "	a one-twelfth bulk.
" 31, "	" "	" "	" 6, "	a trace.
January 1, 1897,	" "	" "	" 7 to 19, "	" "
" 2, "	one-fifth	" "	" 21, "	None.
" 3, "	" "	" "		

Thus it will be seen that so far from there being a suppression of urine during the baths the secretion was markedly increased, amounting to 1980 c.c. (66 + oz.) in the twenty-four hours on January 2d, when he was tubbed five times. In the corresponding twenty-four hours the urea reached 32.8 gms. (506.2 grains), and this, too, on a milk-diet, which affords a moderate percentage of proteids. On the 3d there were 1680 c.c. (56 ounces) and 31.98 gms. (494.4 grains) of urea; on the 4th,

1800 c.c. (60 ounces) with 32.16 gms. (496.2 grains). Then followed a few days of smaller but still free secretion until the 11th, when 2040 c.c. (68 ounces) were again recorded. Throughout the remainder of the illness the secretion, as will be seen from the table, was liberal but fluctuating. He had his last bath, the fifty-third, on January 12th. On the 11th, when two baths were given, the urine rose to 2040 c.c. (68 ounces), with the urea at 44.07 gms. (680 grains), the maximum attained while the analyses were being made. On the twenty-fifth, twenty-sixth, twenty-seventh, and twenty-eighth days of the disease the quantities were 2100 c.c. (70 ounces), 2100 c.c. (70 ounces), 2280 c.c. (76 ounces), 2280 c.c. (76 ounces), with urea amounting to 29.87 gms. (460.9 grains), 24.76 gms. (382 grains), 32.11 gms. (495.6 grains), 32.11 gms. (495.6 grains).

The albumin remained at one-quarter bulk until January 2d, when it fell to one-fifth. On January 5th it was one-twelfth bulk. After that date it disappeared and with it the casts.

No treatment was ordered for the cough, and on January 4th the notes inform us that it continued, though showing some abatement, the expectoration being still copious and mucopurulent, sometimes bloody. On the 7th, we noted that his cough was less, but expectoration about the same. On this day the sputum was examined for tubercle-bacilli with negative results. By the 18th the cough had abated greatly, though the expectoration still contained some blood. At the date of his discharge, February 12th, the cough and expectoration had completely disappeared. A physical examination on the day previous failed to discover anything abnormal.

On January 12th we noted "the patient has developed an otitis media," and on the 18th "both ears are noted as discharging;" on the 20th "that he is deaf," but in other respects is doing well. There appeared no defect in his hearing at the date of discharge.

This is the history of a case of typhoid fever strikingly complicated with conditions which superficial observation would expect to increase any risk to which the patient is subjected by cold bathing, viz., nephritis and deep-seated bronchitis, possibly bronchopneumonia. So far from aggravating either of these two conditions, both abated and early disappeared. The urine, so far from falling off, increased in quantity, and the urea-elimination increased *pari passu*.

The nephritis was, of course, mild, and it is not likely that the kidney-lesion amounted to more than cloudy swelling of the cells. Whether a more active inflammatory condition of the kidney would justify continuing the baths is not so simple a question. Our associate, Dr. Charles G. Stockton, in his part of the splendid symposium held at the annual meeting of the Medical Society of the State of New York, at Albany, on January 28, 1897, "On the Relation of Impure Water to Disease, and the Cure and Prevention of the Latter," names renal complications and intestinal hemorrhage as the only two conditions which contraindicate the full method of Brand. By renal complications he specifically states he means actual inflammatory involvement of the renal epithelium, and

probably did not intend the simpler condition of cloudy swelling present in my case. In point of fact, such a positive degree of inflammation is rarely met with in typhoid fever; but I am inclined to think I would not be deterred from using the tub-treatment by the presence of any degree of nephritis, provided the conditions otherwise calling for it were present. For, after all, in inflammation of the kidney it is not the rapid movement of the blood through the organ which constitutes the inflammation, but rather its stagnation. Now, the direct effect of cold is to increase the force of the heart's contraction, to impel the blood onward and carry it and its toxic ingredients through the kidney, in the course of which a large proportion of these toxic matters are excreted with the urine. E. Ausset¹ has shown conclusively that the toxic properties of the urine secreted during the baths is increased, as contrasted with cases of typhoid not tubbed. Indeed, he assigns almost the entire efficiency of the Brand treatment to this active elimination of toxic agencies.

Vogel's experience supports my own notion as to the harmlessness of the baths, even if active nephritis is present. He refers to an epidemic of scarlet fever among soldiers, a part of whom, on account of circumstances, were treated on the expectant plan and a part with cold baths at 68° to 72° F. every three hours, when the rectal temperature reached 102.2° F. Of the 69 patients subjected to the cold-bath treatment, 5 had nephritis, of whom none died. Of 56 treated by the expectant plan 9 had nephritis and 5 died.

The effect of cold baths in exciting secretion of urine has long been recognized, and almost every person who is in the habit of taking a frequent cold bath has experienced such effect in his own person. It is not remarkable, therefore, that diuresis should be a constant event of the Brand method of treating typhoid fever. The earliest observers of the Brand method called attention to this fact, and every one who has watched the effect of the treatment confirms this. As many as 4000 and 5000 cubic centimetres have been noted.

I have not as yet met the results of systematic urea-estimations daily carried out in the study of the effects of this treatment. The sources of urea in the urine in fever are two: first, the nitrogen in the proteid food ingested; secondly, the oxidation of tissue, which is much increased during the fever-process. It is comparatively easy to estimate the nitrogen ingested by my patient. Being on a milk-diet throughout the whole period of observation, six ounces every two hours, or 72 ounces in the twenty-four hours, the daily amount of milk may be put down at 2232 grammes. Allowing 600 milligrammes of nitrogen for each 100 grammes of milk, the approximate daily amount of nitrogen would be 13.382

¹ E. Ausset: *Bulletins et Mémoires de la Société Médicale des Hôpitaux de Paris*, 1894, Tome ii., 3e Serie, 1894, p. 385.

grammes. Of the total nitrogen eliminated, 95 per cent. may be approximately assigned to the urine, and 5 per cent. to feces, whence 12.7 grammes would be eliminated in the urine. Of this, however, 10 per cent. is uric-acid nitrogen, and 85 per cent. or 11 grammes urea nitrogen. Finally, since the ratio of urea to nitrogen is as 60:80, the proper amount of urea derived from the food ingested would be about 24 grammes if all the milk ingested was absorbed. In point of fact, the actual amount absorbed is probably considerably less than is ingested, so that the urea should be correspondingly less. The urea arising from the tissue-metamorphosis is, of course, disregarded; but allowing for this, the results of my analyses show that the kidneys are quite equal to the work demanded of them. It would be more satisfactory to compare these results with analyses of the urine of a case of typhoid fever on a like diet not treated by the baths. At present, my confidence in the hydiatic treatment is such that I would not feel comfortable to treat a case in any other way unless such treatment was insisted upon by the patient.

ANGINA PECTORIS:

ITS RELATION TO DILATATION OF THE HEART.

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THE purport of the following paper is the consideration of angina pectoris inasmuch as it bears relationship to dilatation of the heart. It includes an estimate of the influence of this relationship in the prognosis and treatment of the subjective symptoms (pain), on the one hand, and of the organic condition (dilatation) on the other. The paper is entirely clinical, and is a record of the writer's observations, not of angina pectoris, but of such of his cases of this affection which manifestly exhibited the relationship above mentioned.

It will be appreciated, the writer trusts, that he is fully cognizant of the difficulties that attend a diagnosis of *angina pectoris*; that he is alive to the fact that, in spite of consummate care, we may err in the diagnosis; that he is aware that the occurrence of cardiac pain is not alone sufficient to admit of the diagnosis.

The presence of the symptom-complex so skilfully portrayed by the earliest historians of this affection, Heberden and Jenner, and more fully elaborated by Latham and Gardiner, is essential to the formation of a diagnosis, although we cannot fail to agree with the dictum of the latest author, our distinguished colleague, Professor Osler, that "pain about the heart of an agonizing character, occurring in paroxysms, is the dominant feature."

We will all admit also that in angina pectoris we are confronted with the facts that it usually occurs in males; that it is an affection of the latter decade of life; that the patients are of the better class, usually well fed, and that they are often the victims of other affections (gout, diabetes, etc.), indicating a more or less sedentary life, with an abundance of food which contributed to the physiological hypertrophy that proceeds with advancing years.

Before proceeding further it may be well to state that we can reasonably infer the presence of *dilatation of the heart* by the physical signs of displaced apex-beat, gallop-rhythm, a soft, regurgitant murmur in the tricuspid or mitral area, by venous phenomena, and by the congestions, cyanosis, and dropsy that attend this affection. The results of cardiac percussion may be confirmatory, but are not looked upon as essential in the diagnosis of cardiac dilatation.

Bearing in mind these fundamental propositions, the writer begs to submit cases (it is to be regretted they are too few) to illustrate the following points:

1. When dilatation of the heart supervenes in a patient the subject of an attack or attacks of angina pectoris the subjective symptoms may subside. At the same time the physical type of the individual changes. (Cases I., II., and III.)

2. Angina pectoris may occur in a patient who has had dilatation of the heart when the organic condition (dilatation) is removed by treatment. (Cases IV. and V.)

3. True angina, when it occurs in dilatation of the heart, admits of a prognosis more favorable than when it occurs with other mural conditions, as myocarditis or hypertrophy, without dilatation. (Case VI.)

4. Grave cases of dilatation of the heart, conversely to the above, may be looked upon as amenable to successful treatment if the patient should have paroxysms of true angina pectoris.

5. In the treatment of angina pectoris digitalis is of doubtful value, not to be given unless there is an excess of dilatation.

6. The pain of angina appears to be due to increased intraventricular pressure, although other causes are no doubt operative.

CASE I. *Angina pectoris; dilatation of heart; relief to angina; death from angina sine dolore.*—A. W. R., aged sixty-seven years, merchant, consulted me for dyspnoea and pain April 3, 1894. Smoked to excess, but did not use alcohol. He had been subjected to severe mental strain. He took but little physical exercise. He had inflammatory rheumatism in 1874; otherwise previous health good.

The patient had the first attack of severe pain after ascending a steep incline. He had had moderate dyspnoea and oppression on exertion previously, but the attack just referred to was such as to compel him to discontinue his efforts. It was noticeable, too, because it was attended by a cold perspiration and the patient was compelled to assume a fixed

position. The attack was followed by others in rapid succession. Subsequent attacks in April and May were attended by pain down the left arm as well as in the precordia.

Physical signs. On the occasion of his first visit it was noted: apex not visible, impulse weak, area of dulness not increased. There was an impure systolic sound at the apex, not transmitted; a short, high-pitched, tricuspid valve sound; a loud, accentuated second aortic, very pronounced at apex and xiphoid. The pulmonic second could scarcely be distinguished. The temporal arteries were prominent. The radial showed very high tension. There was an arcus senilis. There were a trace of albumin and a few hyaline casts. The condition of the other organs was not of material value. Diagnosis: myocarditis; faintly incompetent mitral valves; endarteritis.

The patient remained under observation until his death, thirteen months after the original attack of angina. This time may be divided into two periods. The first was of about three months' duration. During April, May, and June of 1894 he suffered from frequent attacks of angina, but lessening in frequency and violence each week. Notwithstanding the relief he experienced he lost flesh and strength and was confined to his bed. At the same time cardiac symptoms of dilatation ensued. His dyspnoea increased, cyanosis became more marked, and oedema developed. The most striking feature was the change in the type of the man. In April he was hale, with ruddy face, strong voice, and vigorous walk. In July he was pallid, with pinched features and sallow complexion. His form was stooped, his voice feeble. He was very weak, and only by the greatest care was moved to the seashore.

During this time the area of cardiac dulness increased. It extended each week until the left border was two inches beyond the original limit. The right heart enlarged. The second sound, lessening in intensity at the aortic, increased at the pulmonary orifice. The localized mitral impure sound became a loud mitral systolic murmur, transmitted into the axilla. The tension of the pulse lessened and it increased in frequency.

At the seashore he gained flesh and strength—particularly the latter—but never was the same. During the winter the picture changed. Pain was a minimum symptom; chest-oppression was present, dyspnoea was extreme; insomnia; moderate cyanosis and oedema were present. The dyspnoea and weakness were the principal symptoms. He had dilatation of the heart and mitral insufficiency.

The fall and winter months were occupied by the second period of the disease. Dyspnoea continued to be the most serious symptom. The dilated heart grew in size and lessened in strength. An aortic regurgitant murmur developed. Pain was not complained of, and although he had alarming attacks of dyspnoea, he never had an attack of angina. Notwithstanding the dyspnoea the patient went about the house, and daily, weather permitting, took short walks, always careful to eschew elevations.

In April, 1895, he had severe attacks of cardiac asthma, and May 6th he had a most pronounced and typical attack of angina pectoris *sine dolore*, resulting in death in about twenty minutes.

The case was interesting because of the vivid portrayal of the change of the physical type of the individual; because of frequent attacks of

angina pectoris during a period of comparative cardiac hypertrophy, when increased intracardiac pressure could not be relieved; because of the relief to pain obtained by the onset of dilatation, and because of death from angina without pain, when intracardiac pressure was lessened.

CASE II. *Angina pectoris; rapid cardiac dilatation; relief to pain; death from dilatation.*—M. B. M., aged forty-one years, male, physician. The patient was moderate in the use of alcohol and tobacco, but enjoyed and indulged in good, rich food. He was subject to rheumatism, and had in early life one attack of rheumatic fever with pericarditis. The family history was that of rheumatism and gout. The patient was robust, plethoric, and over-weight, although not unduly. He was an excellent specimen of physical manhood. After exertion, early in January, 1888, he was seized with an attack of angina pectoris. In twenty-four hours he had an attack of acute pulmonary congestion. The congestion was attended by acute cardiac dilatation with a mitral murmur. Angina never recurred. He improved, but never could leave his room. In February the dilatation became more pronounced. He died in March from the consecutive congestions due to the dilatation. The autopsy showed atheroma of the coronary arteries, thrombosis, myocarditis, aneurism at the apex of the left ventricle, great dilatation of all the cavities.

It is of interest to note that after the first twenty-four hours cardiac pain disappeared with the onset of acute dilatation. The rapid onset of the pulmonary congestion was induced by the acute dilatation and mitral incompetency, which also relieved apparently the pressure within the heart, and in consequence the pain.¹ It is possible the pain was due to the plugging of the coronary artery, as we know occurs when a peripheral vessel as the brachial, the popliteal, etc., becomes obstructed by embolus or thrombus. The symptom-complex of angina pectoris was so marked, however, that the nature of the affection could not have been mistaken.

CASE III. *Angina pectoris; dilatation; relief; death from remote effects.*—Mrs. L. consulted me in 1890. She was then sixty years of age, robust and energetic. At that time she had frequent attacks of biliary colic. She never had rheumatism. In 1891 she had a mitral systolic murmur and suffered from dyspnoea. She took digitalis over a considerable period of the year. In 1893 the records are found of aortic obstruction and mitral regurgitation. She began to suffer from angina pectoris, and in 1893 and part of 1894 had many severe typical attacks. The heart was hypertrophied. She suffered from vertigo and headache. In 1895 Mrs. L. lost flesh and strength and became anæmic. She also had albuminuria. No attacks of angina occurred from October, 1894, to 1897. During this time the heart became dilated, and she suffered from the symptoms thereof. Curiously, only in 1895 and 1896 were the signs of mitral obstruction present (see autopsy). In January, 1897, death took place from cerebral thrombosis.

¹ See Balfour, *The Senile Heart*, 1894, p. 136. A similar case is related.

The autopsy, performed by Dr. Steele, was as follows: an elderly woman. Subcutaneous fat well preserved. Some cyanosis, but no oedema. Both pleural sacs are about half-full of clear, straw colored fluid. The lungs appear healthy. The pericardium is normal and does not contain fluid. The right auricle is enormously dilated and projects well to the right of the sternum. The left auricle is also greatly dilated, but not to the extent that the right is. The heart is much enlarged, and the apex extends to the left of the midaxillary line. The left ventricle contains some soft clots. It measures 20 mm. in thickness and 10 cm. in length. The myocardium is pale and friable. The papillary muscles show an exquisite mottling of yellow areas, the intermediate spaces being of a dark red. They appear almost cystic, and are so degenerated that they cannot stand upright by themselves.

The muscle of the ventricular wall shows numerous scars throughout its substance.

The leaflets of the mitral valve are thickened by extensive fibrous change. The edges of the leaflets are somewhat adherent. The chordæ are thickened and shortened. The valves admit two fingers to the first joint. The aorta above the valves shows considerable atheromatous change. The valves themselves, though slightly thickened, appear to be competent. The right ventricle is dilated. Its walls measure 6 mm. in thickness. The tricuspid valves are normal, but dilated, and admit five fingers to the second joint.

The weight of the heart is 480 grammes. The coronary arteries are exceedingly atheromatous and rigid, particularly in the upper portion. They do not contain thrombi, but are filled with marantic clot. The deposit of fat around them is somewhat excessive. The arteries throughout the body show a considerable degree of atheroma.

The kidneys are small. The capsule strips badly. There are numerous cysts on the surface of the cortex, which is irregular and scarred. The cortex is contracted and the consistency of the organs is increased.

The liver extends below the costal margin in the midclavicular line.

The stomach is small, measuring but six inches from the cardiac end to the pylorus. The wall is thickened.

The gall bladder is small, thickened, and opaque. The upper third is separated from the rest of the sac by a cicatricial contraction, giving the sac an hour-glass appearance. The small portion is completely filled with soft, yellow gallstones; the lower portion contains a few loose ones.

While under observation the patient became a frail and feeble woman. Her physical type changed, as we saw in Case I. During the period of relatively good health and robustness she suffered from angina; in later years the pain entirely disappeared.

CASE IV. Angina pectoris; dilatation; restored hypertrophy; renewal of angina. Miss G. was sixty-eight years of age when attended by me in 1892 on account of typical attacks of angina pectoris. She had had severe attacks of rheumatism previously, and in 1890 an attack of protracted influenza. Her health failed to an extreme degree after the attacks of angina. There were aortic obstruction and mitral regurgitation, and, rapidly following the angina, dilatation of the heart supervened. During part of 1894 and all of 1895 she was unable to leave her room, and required the attendance of a maid on account of ear-

diac debility. She did not have angina. She took digitalis. In 1896 she grew stronger and went about the house. The heart regained force, and compensatory hypertrophy seemed to be established.

In November, 1896, attacks of præcordial pain recurred and one attack of true angina. Death took place suddenly. Physical examination two weeks before death showed that the heart had regained vigor and was the seat of dilated hypertrophy, as the following signs indicate. There were no evidences of dilatation in excess.

Apex-impulse in fifth interspace, in midclavicular line, plainly visible and somewhat diffused. Cardiac dulness right border, right parasternal line; upper border, lower border third rib: left border 2 cm. left of midclavicular line. No pulsation in vessels of neck and very slight in epigastrium. No thrills. Apex first sound (mitral) soft, systolic murmur transmitted to axilla. At *aortic cartilage* with first sound harsh, blowing murmur transmitted to vessels of neck and toward apex. Second sound accentuated. *Tricuspid* first sound a soft, blowing murmur, entirely different in quality from the other areas, transmitted up and to right about 3 cm.; second sound clear. Pulmonary first and second clear and pure.

Autopsy. Pericardium is normal. The heart is much enlarged. The right auricle is much dilated and extends to the parasternal line in the right. The myocardium of both ventricles is hypertrophied, and both are dilated, the right especially. The left ventricle measures 20 mm. in width; the right 8 mm. Weight of heart 480 grammes. There are many scars throughout the myocardium of the left ventricle not localized to any one locality. The mitral valve is contracted, evidently by old inflammatory processes, and barely admits the first joint of the first finger. The tricuspid orifice is dilated, and admits three fingers easily and four to the second joint. The valves are slightly thickened along their free edge, but there is no evidence of acute inflammatory change.

The conus arteriosus of the aorta is contracted, evidently from a congenital malformation, and at its narrowest point (just below the valves) measures 15 mm. in diameter. The aortic valves are exceedingly thick and studded with calcareous nodules, but appear to be competent. The aorta is very much thickened, and there are calcareous plates about each coronary artery. The coronaries are thickened and calcareous throughout almost their entire extent. Dissection shows no thrombosis or embolism.

It was remarked in the careful notes of the autopsy taken by Dr. Steele that there was no evidence of passive congestion of the internal organs, which would have resulted if cardiac dilatation had been present.

The case presented during life an early period of aortic and mitral stenosis with hypertrophy, during which attacks of angina occurred; a middle period of failing compensation without angina; and a final period of restored hypertrophy and angina.

CASE V. *Angina pectoris following the relief of cardiac dilatation.*—Mr. P. G. was attended by me three years ago during an attack of pneumonia. He was seventy five years old. He had been an active, prosperous merchant, but had withdrawn from business five years before.

He was temperate in all things. After the pneumonia there was prostration, and dilatation of the heart supervened. For six months he was short of breath, the heart was irregular and intermittent, and a gallop-rhythm and systolic mitral murmur were heard. Subjective signs disappeared soon, and last year the murmur could not be heard—indeed, he rode a bicycle for a time. In January, 1897, he had an attack of influenza. The heart became irregular and intermittent, and he had oppression. There were no signs of dilatation. There was high arterial tension. Digitalis was given with nitroglycerin during January and February, because of the old dilatation. Two months ago he began to suffer from angina pectoris. The attacks have persisted, although less frequent since digitalis was discontinued and large doses of nitroglycerin given, which drug also controls the pain.

Physical examination shows strong impulse; no venous phenomena; no thrills; no murmur; occasional gallop-rhythm in the anginal attacks; pure and strong first sounds. Pulse shows high arterial tension. No objective evidence of dilatation.

The patient undoubtedly had, first, dilatation of the heart; second, complete recovery; third, angina pectoris, the pain being paramount because of firm muscles. Digitalis was given with nitroglycerin at first because of the old history of dilatation. Digitalis was taken in a greater amount than required, on the patient's responsibility, and the writer believes it influenced the onset of paroxysms. The angina continued, but was not relieved in severity or frequency of attack until the digitalis was discontinued.

CASE VI. Dilatation of the heart; angina pectoris when the dilatation was at its height; recovery from both.—A. S. G., aged sixty-three years, consulted me in the summer of 1895 for swollen legs and dyspnea. He had a systolic mitral murmur. He grew worse in spite of treatment, and was ill the entire winter of 1895-96 and the summer of that year. He had general anasarca, ascites, and hydrothorax. His chest was tapped frequently. During the spring of 1896 he had frequent attacks of angina pectoris. He had recovered entirely, although physically a different type of man than formerly. Of course, the valvulitis remains. Digitalis could not be given. Strophanthus and nitroglycerin were the only drugs he could take, and these were only admissible at times and in surprisingly small amounts. Time forbids discussing the treatment or management of the case, in which I was ably assisted by Dr. Scott.

The conclusions from the study of this case were that when angina pectoris occurred in the course of valvulitis and dilatation it was not necessarily fatal; moreover, its very occurrence showed there was a strong resisting ventricular wall, and that we could therefore hope for a restoration of the heart-muscle.

From the above studies it seems we are warranted in the belief that *(a)* the pain of angina pectoris is often due to increased intraventricular tension, and that *(b)* subsidence of pain, when dilatation of the heart

comes on, occurs because of incompetency of the valves permitting of relief to the pressure. By this means we may explain the infrequency of angina in mitral regurgitation, and also its infrequency in females and in young subjects in whom the muscles of the heart are not so firm and unyielding as in males. It is well known that with advancing age the heart hypertrophies. Similarly we may infer that the inmates of hospitals and the poor are free from angina because the heart-muscle in this class is not so firm nor so completely hypertrophied. It is interesting to observe that the cases of angina *sine dolore* (as Case I.) are the subjects of dilatation of the heart.

In conversation with my friend Dr. Charles H. Reed on this subject he called my attention to the reasonable analogy that might be traced between glaucoma and angina, and especially to the parallelism of the physical features of the eye and the heart, in both of which increased tension within is attended by pain. The notes of Dr. Reed are of interest and well worth including.

Normal intraocular pressure may cause bulging of the globe (1) when its walls have been weakened by disease (bulbar ectasis from intrauterine choroiditis, staphyloma posticum Scarpa), or (2) are abnormally thin (keratoconus, posterior scleral protuberance of Ammon). Increased intraocular tension under similar conditions is naturally still more apt to be followed by ectasis. The entire eyeball may become enlarged in all its dimensions if increase of tension occur in infancy or early childhood, when the ocular walls present a certain degree of elasticity (hydrophthalmos).

Later in life the eyeball loses its elasticity and becomes hard, rigid, and unyielding, and increase of tension can produce no general enlargement. It does, however, give rise to ectasis at one point—*i. e.*, where the sclerotic is weakened by the separation of its fibres to admit of the passage of the fasciculi of the optic nerve. This less resistant part of the sclerotic, the lamina cribrosa, as it is called, gives way before the increased pressure from within; the head of the optic nerve is forced back into the concavity thus formed, and finally atrophies in consequence of the pressure to which it is exposed, the inner surface of the globe presenting a depression at this point.

Increased intraocular tension is the immediate cause of the disease known as glaucoma, the especial form assumed by this affection and the difference in the symptomatology of the different varieties of the disease being due to variations in the degree of tension, in the rapidity of its development, and in the amount of resistance offered by the ocular walls.

If the increase of tension be gradual and the coats of the eye elastic, the organ may, as in hydrophthalmos, attain enormous proportions with no subjective symptom other than gradual failure of vision. Even

after the walls of the eye have become rigid the glaucomatous process may run its course and destroy vision painlessly, if the tension has not been greatly increased and has been gradual in its development (glaucoma simplex).

This symptom, pain, is due to relative or absolute rigidity of the globe. Although the coats of the eye may still possess some elasticity, they are nevertheless relatively rigid if they cannot adapt themselves to increase of intraocular tension.

Except in the first years of life the ocular tunics are, notwithstanding their flexibility, inelastic, and their rigidity increases with advancing age, particularly if arteriosclerosis be present.

Glaucoma inflammatorium, the type of acute primary glaucoma, occurs most frequently between the ages of fifty and seventy years, a period at which the physiological rigidity of the ocular walls is apt to be still further increased by the atheromatous changes so often met with at this time of life. Under such circumstances marked reaction follows increase of intraocular pressure. The most prominent subjective symptom is pain. It is very severe and neuralgic in character. It is not confined to the eye, but radiates (as in angina pectoris) from it along the first and second branches of the fifth pair. The patient complains of headache and agonizing pain, now in his eyes, now in his ear, and again in his teeth, and his anguish is such that he can neither eat nor sleep. Vomiting is sometimes present, and there may also be fever. The objective symptoms are those of violent inflammation.

Anything that tends to produce congestion of the eye, especially venous congestion, may cause an attack. Overexertion, immoderate eating, nervous excitement, as from rage or anxiety, are sufficient to precipitate an attack.

Measures that diminish the tension relieve the pain.

Prognosis. A word further of the prognosis in angina pectoris. 1. The onset of symptoms and signs of cardiac dilatation in a person suffering from angina pectoris render it safe to predict the highly probable relief to the anginal symptoms. 2. At the same time he can also predict that the type of the individual will change and that the onset of the cardiac condition is the beginning of senility; that henceforth business-cares, etc., must be set aside, and that a life of ease must be led if the years of life are to be added. 3. If angina pectoris occurs in the course of dilatation of the heart (infrequent), it may be looked upon favorably, as (*a*) death will not be so likely to occur from the angina; and (*b*) on the other hand the dilatation can in all probability be restored for a time at least.

THE BACILLUS ICTEROIDES OF SANARELLI¹(BACILLUS *x*—STERNBERG.)

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THE writer's investigations relating to the etiology of yellow fever, made in Havana (1879, 1888, 1889), in Rio de Janeiro (1887), in Vera Cruz (1887), and in Decatur, Alabama (1888), were terminated in 1889.

In the introduction to my last report on "The Etiology and Prevention of Yellow Fever," I say:

"I have now commenced writing a report because I feel that an account of what I have been doing during the past two years is due, and not because I have brought my investigation to a successful termination, or because I feel that there is nothing more to be done.

"No one can regret more than I do that the question of the etiology of yellow fever is not yet solved in a definite manner, but I at least have not to reproach myself with want of diligence or failure to embrace every opportunity for pursuing the research. The difficulties have proved to be much greater than I anticipated at the outset. If the task before me had been to find an organism in the blood, like that of relapsing fever, or of anthrax, or an organism in the organs principally involved, as in typhoid fever, or leprosy, or glanders, or in the intestine, as in cholera, the researches I have made could scarcely have failed to be crowned with complete success. But this has not proved to be the case, and among the micro-organisms encountered there is not one which by its constant presence and special pathogenic power can be shown indisputably to be the specific infectious agent in this disease."

While my researches did not justify me in announcing the discovery of the yellow fever germ, I had a strong suspicion that a bacillus which attracted my special attention during my last summer in Havana was the specific infectious agent of the disease under investigation. This was my bacillus *x*, to which I refer in my report, as follows:

"The general results of my culture-experiments in 1888 having enabled me to exclude the supposition that the specific infectious agent in the disease under investigation is a liquefying micro-organism, I have naturally turned my attention to the non-liquefying bacilli present in the alimentary canal, and in certain cases obtained in my cultures from the tissues. The one most constantly and abundantly present, my bacillus *a*, having been excluded, I have given much time to the study of other non-liquefying bacilli associated with it, and especially to that one which I have designated by the letter *x*, and which, for the present, I shall give no other name.

"This bacillus resembles the bacterium coli commune (bacillus *a*) in its morphology, although somewhat larger; and its colonies in gelatin roll-tubes are also quite similar, especially when young. It is, however,

¹ Read at the Twelfth International Medical Congress, held at Moscow, 1897.

fully differentiated from the 'colon-bacillus' by its pathogenic power when injected into the peritoneal cavity of rabbits.

"I am now satisfied that this bacillus was present in my cultures made from the intestines of yellow-fever cadavers in 1888, although I did not differentiate it from my bacillus *a* at that time. This is shown by the pathogenic potency of certain cultures supposed to contain only bacillus *a*, while pure cultures in bouillon, made from single colonies, proved not to be pathogenic. The apparently contradictory results obtained in my inoculation-experiments I could not at the time explain, but now believe this to be the true explanation. I first recognized this bacillus by its pathogenic power, in experiments starting from material obtained from the liver of Case XVIII. (autopsy May 13, 1889). Three minims of this material, containing also the large anaërobic bacillus designated by the letter N in my experiments made at this date, were injected into guinea-pig No. 43. Death occurred at the end of fourteen hours. A second guinea-pig (No. 45) was inoculated with three minims of bloody serum from the subcutaneous connective tissue of the first. At the end of forty-eight hours there was a pouch in the abdominal walls containing a collection of bloody serum. A little of this was drawn off in a capillary tube, and cultures made from it. It was in these cultures that I first recognized my bacillus *x*. Its great pathogenic power when injected into the cavity of the abdomen of rabbits was first demonstrated by the following experiment:

HAVANA, May 22, 1889, 12 M.

"Injected into the cavity of the abdomen of rabbit No. 108, 1 c.cm. culture of bacillus *x* in glycerin-agar. At 2.30 p.m. the animal is lying upon its side breathing slowly, and is evidently dying; died at 2.40 p.m."

I say further in my report:

"I would say finally with reference to this bacillus that I have not encountered it in my comparative researches made by the same methods upon cadavers from other disease than yellow fever."

This fact, taken in connection with its intense pathogenic virulence, led to the suspicion, and at times almost to the conviction, that this must be the specific germ I was in search of; but scientific conservatism compelled me to withhold any announcement of a discovery in view of the fact that I had failed to obtain this bacillus in a considerable number of undoubted cases of yellow fever. With reference to this point I say:

"In my subsequent researches I have obtained this bacillus in about one-half the cases, either directly in my cultures from material contained in the small intestine, or indirectly in my inoculation-experiments upon rabbits and guinea-pigs. It does not follow that it was not present in those cases in which I have not demonstrated its presence. My autopsies at this time followed each other in quick succession, and a complete bacteriological study of each case was impracticable. If the colonies in gelatin roll-tubes had presented well-marked differences from those of the colon bacillus, the matter would have been greatly

simplified; but I did not feel justified in attempting to decide that bacillus *x* was present in such tubes from an examination of the colonies alone, or from this and the examination of a stained preparation together. Nothing short of the inoculations of a pure culture into the cavity of the abdomen of a rabbit seemed to me at that time to suffice for the differentiation. The difficulty is increased by the fact that the colonies of both bacilli vary considerably in the same medium at different times. In general, however, the deep colonies of bacillus *x* are more opaque and of a deeper brown color than those of the colon-bacillus, and the superficial colonies¹ are thicker and more opaque. The difficulties referred to prevent me also from estimating with any degree of accuracy the relative abundance of bacillus *x* in the contents of the intestine. I do not hesitate to say, however, that the colon-bacillus has been the most constant and most abundant micro-organism in my cultures from this source. I have more frequently obtained bacillus *x* in my inoculation-experiments than in cultures made directly from the contents of the intestine or material from the liver kept in an antiseptic wrapping. *It has been frequently present in cultures made from the liver of animals which have died from such inoculations.*"

Sanarelli has recently (June 10, 1897) given an account of his researches in a lecture delivered before the University of Montevideo, a translation of which in the *British Medical Journal* of July 3d is the source of my information relating to his bacillus icteroides. In this article he says: "According to the results of my researches the isolation of the specific microbe of yellow fever is only possible in 58 per cent. of the cases." It will be noted that in the extract from my report above quoted I say that "In my subsequent researches I have obtained this bacillus in about one-half the cases," *i. e.*, subsequent to its recognition and differentiation from the colon-bacillus. It will also be noted that I first obtained it, by inoculation in guinea-pigs, from the liver of a yellow-fever cadaver. A method employed by me in my investigations and described in my report consisted in placing in the inoculating-oven for from twenty-four to forty-eight hours a piece of liver or kidney obtained at the autopsy, and at once enveloped in an antiseptic wrapping. In my report I say with reference to this material, which was always found to contain numerous bacteria of various species: "Now, if a little material from the interior of one of the pieces is injected beneath the skin of a guinea-pig, my experiments show that death generally occurs within a comparatively short time." Speaking of cultures from the liver or blood of a guinea-pig which has succumbed to such an inoculation, I say: "Very often I have obtained in these cultures my bacillus *a* or bacillus *x*, or both of these." Sanarelli says with reference to his bacillus icteroides: "The best method for demonstrating not only its presence, but also the special tendency it has to be localized in small groups in the blood-capillaries, is to place a fragment of liver, obtained

¹ White by reflected light.

from the body whilst fresh, in the incubator at 37° C. for twelve hours; this favors the multiplication of the specific microbes."

It would appear from the account before me that Sanarelli used this method for demonstrating the presence of his bacillus icteroides in thin sections of liver and kidney. It is doubtful whether such a demonstration should be accepted in view of the fact that the colon-bacillus and other saprophytes are commonly present, and some of these probably could not be differentiated by their morphology from bacillus icteroides.

Sanarelli gives the following account of the morphology of his bacillus:

"The bacillus at first sight presents nothing morphologically characteristic. It is a little bacillus with rounded extremities, for the most part united in pairs in the culture, and in small groups in the tissues, from two to four thousandths of a millimetre in length, and, as a rule, two or three times longer than broad. It is very pleomorphic."

This corresponds with the morphology of my bacillus *x*, which is described in my report as follows:

"This bacillus varies considerably in its morphology, as is shown by my photomicrographs. In recent gelatin-cultures it is often so short an oval in form that it might be mistaken for a micrococcus. In cultures in bouillon or in coconut-water it resembles the colon-bacillus, but is larger—1 μ or more in diameter. The rods are often united in pairs, and in the same culture may vary considerably in length" (pleomorphic).

The bacillus of Sanarelli and my bacillus *x* are both non-liquefying, and both grow readily in the ordinary nutrient media employed by bacteriologists. In their biological characters they are certainly very similar, if not identical. This is shown by the following quotations from my report and from Sanarelli's paper. Of bacillus *x* I say:

"This bacillus is a facultative anaërobic. It grows well in agar-cultures and especially in glycerin-agar, in which it produces some gas and an acid reaction. The growth on the surface of glycerin-agar culture is white, cream-like in consistency, and quite abundant. . . . The superficial colonies are circular or irregular in outline, with transparent margins and an opaque central portion, sometimes corrugated. They are finely granular and iridescent by reflected light, and of a milk-white color; by transmitted light they have a brownish color. Young colonies closely resemble those of the colon-bacillus (*a*). This bacillus grows well at a temperature of 20° C. (68° F.), but more rapidly and luxuriantly at a higher temperature—30° to 35° C. Its vitality is not destroyed by exposure in a freezing-mixture of ice and salt for two hours. The thermal death-point is between 140° and 145° F. (60° to 62° C.)."

Sanarelli says of his bacillus:

"In plate-culture in ordinary gelatin it forms roundish colonies, transparent and granular, which during the first three or four days

present the appearance of leucocytes. The granulation of the colony becomes continuously more marked, and usually a central or peripheric nucleus, completely opaque, is delineated. With time the entire colony becomes opaque, but does not liquefy gelatin. Streak-cultures on gelatin solidified obliquely, forming brilliant opaque little drops similar to drops of milk. . . . It is a facultative anaërobe, does not resist Gram's stain,¹ slowly ferments lactose, more actively glucose and saccharose, but is not capable of coagulating milk; it strongly resists drying, dies in water at 68°, and is killed in seven hours by the solar rays, but lives for a long time in sea-water."

According to Sanarelli, the growth of his bacillus in agar-agar presents certain important characteristic features. He says:

"The culture on agar-agar, unlike what is observed with the greater part of the known pathogenic microbes, presents for the bacillus icteroides a diagnostic means of the first importance. When the colonies develop in the incubator they assume an aspect which does not differ from that of many other microbial species—that is, they are roundish, gray, a little iridescent, transparent, with a smooth surface and regular margins. If instead of making them grow at a temperature of 37° C. they are left to grow at a temperature of 20° to 22° C., the colonies are like drops of milk, opaque, prominent, and with pearly reflections, completely different from those developed in the incubator. This different manner of development can be utilized by exposing the cultures for the first twelve to sixteen hours to the temperature of the incubator, and then keeping them for twelve to sixteen hours more in that of the room. The colonies then show a flat central nucleus, transparent and bluish, and surrounded by a prominent and opaque zone, the whole resembling a drop of sealing-wax. As this character, which for the present may be considered specific, can fortunately be obtained, even in twenty-four hours, it serves to establish, in the most rapid and certain manner, the bacteriological diagnosis of the bacillus icteroides."

I have not described the characters of growths of my bacillus in agar-agar further than to say that:

"It grows well in agar-cultures, and especially in glycerin-agar, in which it produces some gas and an acid reaction. The growth on the surface of glycerin-agar cultures is white, cream-like in consistency, and quite abundant."

The evidence thus far presented is strongly in favor of the view that the bacillus of Sanarelli is identical with my bacillus *x*. And unless this identity is conceded it will be difficult to admit that the bacillus of Sanarelli is the veritable yellow-fever germ, for I made numerous cultures from yellow fever cadavers in Havana, by the most approved methods, studying carefully all of the bacteria which I was able to obtain in these cultures. If the bacillus icteroides of Sanarelli was present in the blood or tissues of yellow fever patients in Havana, I

¹ Bacillus *x* does not stain by Gram's method. It causes active fermentation in culture-media containing glucose.

could not have failed to find it, as it grows readily in the culture-media employed in my investigations; but unless it is identical with my bacillus *x*, it was not present in the blood and tissues of the yellow-fever cadavers examined by me during my extended researches in Havana.

Having stated the evidence which leads me to believe in the identity of Sanarelli's bacillus icteroides and my bacillus *x*, I must call attention to the experimental evidence which seems to be opposed to the view that yellow fever results from the presence of this bacillus in the blood and tissues of those attacked with the disease.

Both the experiments of Sanarelli and my own show that this bacillus is pathogenic for guinea-pigs and still more so for rabbits. If, therefore, it is present in the blood and tissues of those who succumb to the disease, the inoculation of blood or of liver-parenchyma should be fatal to those animals. The following experiments made by me in Havana show that this is not the case. I quote from my report published in 1890 (pages 125 *et seq.*):

"My experiments made in Havana during the epidemic season fully confirm those of Range as to the innocuity of yellow-fever blood when injected into guinea-pigs in considerable quantity. This is shown by the following experiments:

"May 13, 1889. Injected one-fourth of a cubic centimetre of blood obtained at autopsy from heart of Case VII. into the abdominal cavity of a very small guinea-pig. Result negative.

"13th. Injected one-half of a cubic centimetre of blood-serum from heart of Case XVII. into cavity of the abdomen of another small guinea-pig. Result negative.

"23d. Injected subcutaneously and also in cavity of abdomen a small amount of crushed liver-tissue from Case XIX. into guinea-pig No. 54. No result.

"26th. Injected into subcutaneous tissue of guinea-pig No. 58 one half of a cubic centimetre of crushed liver-tissue from Case XX. No result.

"June 4th. Injected subcutaneously into guinea-pig No. 82, 5 minims of crushed liver-tissue from Case XXII. No result.

"13th. Injected subcutaneously into guinea-pig No. 100 one-half of a cubic centimetre of blood and crushed parenchyma from liver of Case XXIV. No result.

"13th. Injected subcutaneously into guinea-pig No. 101 one cubic centimetre of blood and crushed tissue from kidney from Case XXIV. No result.

"29th. Injected subcutaneously into guinea-pig No. 126 one-half of a cubic centimetre of blood and liver-pulp from Case XXV. No result.

"All of these injections were made with material in which no micro-organisms were recognized in smear-preparation stained with fuchsin. In the following cases in which death followed the inoculation micro-organisms were present:

"May 27, 1889. Injected subcutaneously into guinea-pig No. 60 (quite small) 4 minims of material from the liver of Case XXI., just collected. This animal was found dead at 6 A.M. on the morning of

May 28th. The autopsy showed extensive subcutaneous oedema extending from point of inoculation, and the effused serum contained a large anaërobic bacillus—my bacillus N.

“*July 16th, 7.30 A.M.* Injected subcutaneously into guinea pig No. 153, 5 minims of blood from the liver of Case XXVIII., containing a large bacillus; slide 1325 (N?). The animal died at 10 P.M. Extensive subcutaneous effusion of bloody serum. Bacillus N recovered from liver.

“These experiments show that blood and liver-tissue obtained at recent autopsies do not, as a rule, kill guinea-pigs, but that in exceptional cases in which the large anaërobic bacillus is present, which I have designated by the letter N, death may occur very promptly.

“I have also obtained negative results from injections of fresh liver-tissue into rabbits.

“*August 9, 1889.* Injected subcutaneously into rabbit No. 158, 2 minims of crushed liver-tissue from Case XXX. Result negative.

“*12th.* Injected subcutaneously into rabbit No. 164, 5 minims of material from the liver of Case XXII. Result negative.

“*13th.* Injected subcutaneously into rabbit No. 189, 4 minims of material from the liver of Case XXXIII. Contains bacillus N; slide 1426. Result negative.

“*15th.* Injected subcutaneously 1 cubic centimetre of material from the liver of Case XXXV., principally blood, into rabbit No. 170. Result negative.

“*19th.* Injected subcutaneously one-half of a cubic centimetre of material from the liver of Case XXXVI., into rabbit No. 178. Result negative.

“*21st.* Injected subcutaneously into rabbit No. 183, 2 minims of material from the liver of Case XXXVII. Result negative.

“*22d.* Injected subcutaneously 1 cubic centimetre of blood and liver-tissue from Case XXXVIII. into rabbit No. 184. Result negative.

“These experiments suffice to show that, as a rule, blood and liver-tissue from a recent autopsy are not pathogenic for rabbits. But in the following case death resulted from the subcutaneous injection of similar material:

“*August 10, 1889.* Injected subcutaneously into rabbit No. 159, 3 minims from the liver of Case XXXI. Animal died in convulsions at 1 P.M., August 12th.

“The bacillus of rabbit-septicæmia was recovered from the liver in an agar-stick culture.

“The same bacillus was obtained indirectly from another case, as follows:

“Guinea-pig No. 172, injected July 31st with material from the liver of Case XXIX., kept forty-eight hours in an antiseptic wrapping, died the following day. Anaërobic culture in glycerin-agar from the liver of this guinea-pig contained bacilli, and was injected (1 cubic centimetre) into guinea-pig No. 144, which died at the end of thirty-two hours from the time of injection. An anaërobic culture in blood-serum from the liver of this guinea-pig was injected on August 6th into rabbit No. 150, which died the following day. The blood and liver of this rabbit contained a small bacillus with stained ends, which proved to be the bacillus of rabbit-septicæmia. Cultures from the blood and liver of this rabbit and the preceding one were subsequently injected into other

rabbits with a uniformly fatal result, and the bacillus was fully identified as Koch's bacillus of rabbit-septicemia, now generally admitted to be identical with the bacillus of fowl-cholera, first described by Pasteur as a micrococcus."

In the two cases referred to in which the bacillus of rabbit-septicemia was found there was evidently a secondary infection with this bacillus; but in the series of cases studied by me in Havana such secondary infection was unusual, if we exclude the cases in which the colon-bacillus was found, as a rule, in comparatively small numbers. It may be that secondary infection is more common at Rio. It is evident that the bacillus found by Babes in material sent to him from Rio de Janeiro was present as the result of a secondary infection. In speaking of this bacillus in my report I say:

"Babes himself has renounced the idea that this micro-organism bears an etiological relation to the disease under consideration. In the second edition of *Les Bacteries* he says:

"Since these researches we have had the opportunity to examine several series of sections from yellow fever. First, the liver and kidney of two individuals dead from this malady, collected by Dr. Alvarez, were examined in the Laboratory of Pathological Anatomy of the Faculty of Paris, without any bacteria having been found; second, material from three cases of yellow fever which Koch was kind enough to confide to one of us. In these last three cases, notwithstanding the most scrupulous research, and notwithstanding the advice of Koch, it was impossible to find the little chains in the brain, the kidneys, the liver, and the spleen. We must suppose, then, that in yellow fever, as in other infectious maladies, microbes are only found in the parenchymatous organs in certain cases, and not in all. The question whether these micro-organisms really constitute the cause of the malady, or simply a complication, is consequently not resolved."

"The fact that this micro-organism was not present in the liver and kidney of forty cases in which I made autopsies in Havana, is ample evidence that its presence in the material from Dr. Lacerda's laboratory, which was sent to Babes, was accidental, and bore no relation to the etiology of the malady."

With reference to the presence of micro-organisms in the liver and kidney obtained from yellow-fever cadavers, the autopsy being made as soon as possible after death, I quote from my report as follows:

"In all infectious diseases which have been proved to be due to the presence of a parasitic micro-organism in the blood this organism may be demonstrated in properly stained thin sections of the tissues. In such sections we often obtain cross-sections of small bloodvessels in which the blood-corpuscles are *in situ*, and in which a stained micro-organism, if present, would be very apparent. We also have a satisfactory view of the contents of the capillary vessels of the liver, kidney, brain, etc., in well-prepared sections of these organs. Pathologists, therefore, look upon a careful research, by the methods which have been perfected with this object in view, as of prime importance in any attempt to prove

whether a given infectious disease depends upon the presence in the blood of a specific micro-organism. Moreover, in certain infectious diseases in which a parasitic micro-organism has been proved to be the essential etiological factor this organism is not found, as a rule, in the general blood-current, but is present in the tissues especially implicated in the morbid process; *e. g.*, in typhoid fever, in the spleen and intestinal glands; in tuberculosis, in tubercular nodules in the lungs and elsewhere. Failure to find a parasitic organism in blood drawn from the finger is, therefore, not satisfactory evidence of the absence of a specific germ from the tissues of the organs involved."

As in yellow fever the liver and kidneys give evidence of pathological changes resulting from this disease, I have naturally given special attention to these organs in the researches I have made.

The Havana Commission in 1879 made numerous sections of material preserved in alcohol from eighteen cases, and a careful examination of these sections failed to reveal the presence of any micro-organisms; but as more satisfactory methods of staining have since been devised, I do not consider the work done at that time as conclusive in this regard.

I therefore wrote to my friend, Dr. Daniel M. Burgess, of Havana, some time during the summer of 1884, requesting him to obtain for me small pieces of liver, kidney, and stomach from one or more typical cases of yellow fever. I made it an essential condition that the autopsies should be made within an hour, or, at the outside, two hours after death, so that there might be no question of post-mortem changes. Small pieces of the organs named were to be put at once into a large quantity of strong alcohol. In compliance with my request, Dr. Burgess obtained and forwarded to me material from two cases, which reached me in good condition, and, upon microscopic examination, the liver and kidneys showed the pathological changes constantly found in the disease in question. During the winter of 1884 I mounted numerous thin sections from this material, stained with various aniline colors. In none of them did I find any micro-organisms, except upon the surface of the mucous membrane in sections of the stomach, where various organisms—bacilli and micrococci—were to be seen in properly stained sections. These were, however, only upon the surface, attached to the epithelium, or mingled with a glandular debris adhering to the surface of the mucous membrane. In the autumn of 1885, during a visit to Dr. Koch's laboratory in Berlin, I had an opportunity to avail myself of the suggestions and valuable assistance of the master in bacteriology, and again studied the material which Dr. Burgess had sent me from Havana by the various methods of staining considered to be most useful in such a research. At the request of Dr. Koch I was assisted in this research by Dr. Carl Seitz, who was at the time engaged upon his studies of the typhoid bacillus, and was an expert in staining and mounting thin sections of the tissues. Dr. Seitz and myself examined

numerous sections of liver and kidney stained by various methods, with an entirely negative result so far as the presence of micro organisms was concerned. After my return to Baltimore, in 1886, I again made numerous sections from the same material, and stained them with Loeffler's alkaline solution of methylene-blue, which we had also used in Dr. Koch's laboratory, and with other aniline colors, but without any better success.

Desiring to repeat these researches upon fresh material, I wrote to my friend, Dr. Burgess, during my stay in Rio (June and July, 1887), requesting him again to collect pathological material for me from at least four cases of yellow fever, so that after my return to Baltimore I might continue these investigations. As before, this material was to be obtained as soon as possible after death, and to be put at once in strong alcohol. About December 1st I received from Dr. Burgess the desired material in good condition, together with the following letter:

HAVANA, NOV. 19, 1887.

"MY DEAR DOCTOR: I send you, per Dr. Spore, of 'City of Washington,' which sails today, one box of pathological specimens. . . . You can rely implicitly upon the specimens having been taken from well-diagnosed yellow-fever cases, at the time post-mortem stated on the bottles. All had, besides the proper temperature-curve, irritable stomach, black vomit, highly albuminous urine, eventually in most cases suppression of urine, etc. I saw them repeatedly."

The bottles were marked as follows:

"Case No. 1.—Sick from August 14 to 19, 1887. Autopsy one hour after death.

"Case No. 2.—Died September 23, 1887, at 4.30 A.M. Autopsy two and one-half hours after death.

"Case No. 3.—Died October 5, 1887, at 2.30 A.M. Autopsy fifteen minutes after death.

"Case No. 4.—Died October 26, 1887, 5.30 A.M. Autopsy 7 o'clock A.M., body still warm (temperature 40° C.)."

From the above-described material I have had made a large number of very thin sections, which I have studied by various methods of staining and with objectives of high power, the one-eighteenth and one-twelfth inch hom. ol. im. of Zeiss. I have used especially the alkaline solution of methylene-blue of Loeffler; Gram's well-known method, with methyl-violet, followed by iodine solution and decolorization with alcohol; the method of Weigert, which is the same as Gram's up to the point of removing the sections from the iodine solution, when they are decolorized and dehydrated with a mixture of two parts of aniline oil to one part of xylol. I have been especially pleased with the last-mentioned method, which gives fine views of the tissue-elements and any micro-organisms which may be present. I have also stained numerous

sections with fuchsin in solution with carbolic acid (5 per cent.), or with aniline oil (tubercle-stain), and with various other aniline colors.

I think I am safe in asserting that all known pathogenic micro-organisms may be stained by one or more of the methods above referred to. Indeed, the alkaline solution of methylene-blue is, so far as I know, an agent which stains all organisms of this class, although there are differences as to the rapidity with which they stain and the tenacity with which they retain the color imparted to them.

The result of this research has again been negative so far as the general presence of any particular micro-organism in the material examined is concerned. But in one case (No. 4) I found in the kidney a minute bacillus, which apparently invaded by preference the glomeruli. It was not found in the capillaries generally, but a certain number of foci were found, some small, and involving only a portion of a glomerulus, others involving a whole glomerulus and the tissues immediately surrounding it.

It is quite probable that during the last hours of life a certain number of micro-organisms from the intestines succeed in passing through the enfeebled tissues to the interior of the capillaries, and are carried away by the already slowly moving blood-streams to distant organs, where they may establish centres of growth even before death occurs, or are at least in position to take possession of the field as soon as the vital spark has been extinguished. In the case in question I believe that the true explanation of the presence of the organisms described is that suggested, for I have not found in the other cases examined any similar collection of bacilli, and cannot, therefore, attach any importance to the observations so far as the etiology of yellow fever is concerned. In Berlin I fell upon a little group of minute, slender bacilli, in a capillary of the liver, and recently I have found a similar group in a preparation of skin from a yellow-fever patient. I have also in the course of my extended observations seen two or three groups of micrococci, or of what appeared to be micrococci. But I attach no importance to such observations. Evidently any organism concerned in the etiology of an infectious disease should be found not occasionally and in certain cases only; but if seen at all by the staining-methods adopted, it should be found distributed through the organs involved in sufficient numbers to leave no doubt as to its presence, not as an accident, but as a general and constant thing in all cases of the disease under investigation.

The bacillus above described, present in a single case, is, then, the only micro-organism found in the material obtained in Havana in 1887 so far as the liver and kidney are concerned. In my stained sections of stomach and intestine I have observed various micro-organisms upon the surface of the mucous membrane, but extended researches have failed to show that any one of these organisms invades the living tissues of the alimentary canal.

The material preserved in alcohol at my autopsies made in Havana in 1888 and 1889 has also been carefully studied by myself and by my laboratory assistants. The results correspond with those obtained by the culture-methods employed in the same cases. *In those cases in which my cultures gave a positive result I have, as a rule, found the same micro-organisms in thin sections of the same material—liver, spleen, kidney—preserved in alcohol.*

Thus the sections from Case IX. (1888) contain numerous bacilli which correspond in their morphology with the colon-bacillus which was obtained in my cultures from the blood, liver, and kidney of the same case. The same is true of Case XX. In Case XIV. and in Case XXXIII., in which my bacillus X was present in smear-preparations from the fresh liver-tissue, it is also present, as was to have been expected, in thin sections of the liver preserved in alcohol. In short, while the general result has been negative, various bacilli have been found in certain cases, and in one case (X.) groups of micrococci are present in thin sections of the kidney.

In order that this part of the work might be as thorough as possible and free from the reproach of personal bias or imperfect technique, I have had a series of sections made from twenty-five of my Havana autopsies by my friend, Dr. James E. Reeves, of Chattanooga, Tenn., and have placed them beside my own sections and those made under my direction by my laboratory assistant, Dr. Emilio Martinez. These slides will be transmitted with my report for permanent preservation in the Army Medical Museum.

Further, I have submitted this entire series of slides to Dr. William T. Councilman, of the Johns Hopkins University, for careful study, and give below his report upon the results of his examinations:

"I was requested by Dr. Sternberg to examine the material which he had collected from a large number of cases of yellow fever. This material was collected in Havana, and in the South in the epidemic of 1888. Sections which had been made by Dr. Reeves in Chattanooga, and under Dr. Sternberg's direction at the Johns Hopkins University, were carefully examined, and, in addition, the material from thirty autopsies was given me by Dr. Sternberg and further investigated at the pathological laboratory of the Johns Hopkins Hospital. Most of this material was obtained from fresh autopsies two to twelve hours after death and was hardened in alcohol; only three of the cases examined were hardened in Müller's fluid.

"One hundred and thirty sections were examined, among them three which Dr. Sternberg had obtained from Dr. Freire in Brazil. These sections were stained in methylene-blue, gentian-violet, Bismarck brown, and with the Gram and Weigert methods. The sections which were given Dr. Sternberg by Dr. Freire in Brazil were stained red, probably with fuchsin. Of these specimens it is not necessary to say much. It was most impossible to say from what tissue they were made, and to

have recognized any organisms in the precipitate of staining-fluid and other débris would have been impossible. The sections made by Dr. Reeves and those under Dr. Sternberg's direction were in general good, particularly the latter. It is probable that these sections show clearly all the bacteria which are contained in the tissues, for other more complicated methods of staining gave the same results as to bacteria. All of the bacteria found were stained with the simplest methods. Bacteria of some sort were found in 28 of the 130 sections examined; of these, 18 were in sections of the liver, 8 of the kidney, and 1 each of stomach and lymph-gland. There was nothing in their form or relation to the tissue that would lead one to suppose that their presence was other than accidental. In no case could any connection be shown between their presence and the essential lesions of the disease. There were both micrococci and bacilli, in some cases arranged in groups, in others they were single or in indefinite masses. In no case was there any lesion in the surrounding tissue which could be attributed to their presence. Among the bacilli were some which agreed in form with the colon-bacillus.

"The micrococci were in the form of well-known emboli, and were found in the bloodvessels of the liver and kidneys; in the latter generally in the glomeruli. In but one case were bacilli found in the tubules of the kidney.

"Five sections of stomach were examined, but nothing characteristic found in these. In one of these sections there was some evidence of gastritis shown, by the presence of leucocytes in and between the epithelial cells, and below the epithelium small-cell infiltration. The epithelium was in general well preserved.

"The sections of intestine, spleen, and lymphatic gland were perfectly normal. In one of the sections of lymphatic glands there were numerous masses of short bacilli, which were also found in the other organs from the same case (Case IX.)."

It will be seen that in my investigations there is a correspondence in the results obtained by the direct examination of thin sections of tissue preserved in alcohol, by culture-experiments made from blood and liver-tissue collected at the autopsy and by inoculations of the same material in guinea-pigs and rabbits.

With reference to my inoculation-experiments, however, it is possible that the results are misleading, owing to the fact that I recorded a negative result when my guinea-pigs and rabbits showed no evidence of being sick at the end of five or six days, and, owing to limited space in my laboratory, did not keep inoculated animals under observation for a longer period than this. But, according to Sanarelli, his bacillus icteroïdes "in guinea-pigs, in very small or large doses, produces a cyclical febrile disease which always ends in death after eight to twelve days."

With reference to the presence of this bacillus in the tissues, he says:

"A search for it in the tissues does not give good results, excepting in the cases in which the death of a patient occurs without secondary septicaemia. Even in the cases which on bacteriological examination

give the purest results, it is not easy to see it in the sections of the tissues, owing to the number being sometimes extremely small."

The results of my culture-experiments with blood collected post mortem from the heart and with material (parenchyma and blood) obtained from the liver and kidney are stated in my report as follows:

"My first five autopsies, made in 1888, gave a negative result. In Case VI., autopsy four hours after death, colonies of two different kinds were obtained in cultures from the blood, liver, and kidney. One of these was my bacillus *a* (*bacterium coli commune*).

"Again, in Cases VII. and VIII. the result was negative; but in Case IX., in which the autopsy was made five hours after death, numerous colonies of bacillus *a* developed in my cultures from the blood, liver, and kidney. The next case in which I obtained micro-organisms from the blood was Case XV., Havana, 1889. In this case a few colonies of a different bacillus were found.

"In Case XVIII. I again obtained a few colonies of bacillus *a*.

"Case XIX. gave a negative result, and in subsequent autopsies I did not collect blood from the heart, inasmuch as the material obtained from the liver always contained a considerable quantity of blood, and would show the presence of micro-organisms if they were to be found in the general circulation.

"The results obtained in my aerobic cultures from the liver and kidney are as follows:

"In Case I. I obtained a single colony of bacillus *a* in my culture from the kidney. The same bacillus was obtained from the kidney of Case III. and in Case V.; the culture from Case VI. gave the same bacillus in gelatin Esmarch tubes from the liver and kidney, associated with another bacillus not particularly described in my notes. In Case IX. I obtained numerous colonies of bacillus *a* in cultures from the blood, liver, and kidney. In Case XIV. a few small, transparent colonies developed in my culture from the liver, a few colonies of a micrococcus were obtained from the spleen, and my bacillus *q* was obtained from the spleen and kidney. In Case XVI. numerous colonies of a bacillus designated by the letter *q*, which I now believe to be identical with my bacillus *x*, were obtained in my gelatin Esmarch tubes from the liver and kidney. This autopsy was a late one, having been made thirteen and one-half hours after death. In Case XVIII. a few colonies of bacillus *x* were obtained from the kidney. In Case XX. the colon-bacillus (*a*) was obtained from the liver; in Case XXVIII. my cultures from the liver contained a liquefying bacillus. In Case XXIX. cultures from the liver contained bacillus *a* and bacillus *x*. In Case XXX. cultures from the liver contained numerous colonies of bacillus *a* and of bacillus *x*. In Case XXXIII. numerous colonies of bacillus *a* were obtained in gelatin Esmarch tubes from the liver.

"A summary of these results shows that I have obtained micro-organisms in my aerobic cultures as follows: in blood from the heart, 1 times in 19 cases; in the liver or kidney or both, 13 times in 43 cases.

"It will be noticed that the micro-organisms most frequently encountered were non-liquefying bacilli, my bacillus *a* and bacillus *x*."

These results led me to the following conclusion :

“ The non-liquefying bacilli found in a certain proportion of the cases are not in sufficient numbers or sufficiently constant to give support to the view that they are the specific cause of the disease, and the fact that they are not found in a considerable number of typical cases is sufficient reason for excluding them as being directly concerned in its etiology by reason of their presence in the blood and tissues. But we may suppose that they have their proper habitat in the alimentary canal, and that the morbid phenomena are due to a toxic ptomaine produced in this situation. Under this hypothesis the occasional presence of these bacilli in the tissues is to be regarded as accidental and as resulting from the emigration, during the last hours of life, or post mortem, of micro-organisms from the intestine, and we have to ascertain whether one of the bacilli found most commonly in the tissues or any other micro-organism present in the alimentary canal is the specific agent we are in search of.”

The results of my cultures made from the contents of the intestine of yellow-fever cadavers are stated in my report as follows :

“ As already stated, when my cultures from the blood or tissues have given a positive result the micro-organisms present have been non-liquefying bacilli, and those most frequently found have been my bacillus *a* and my bacillus *x*. Both of these have been present in my cultures from the intestinal contents, and I cannot doubt that this is the source from which they made their way into the blood. I have identified bacillus *a* with the *bacterium coli commune* of Escherich, and it is consequently excluded as the specific cause of yellow fever. *Bacillus x* I have not obtained up to the present time in my comparative researches, and consequently regard it as possibly connected with the etiology of the disease. But I have not been able to obtain any satisfactory experimental evidence upon which to base a positive claim that this is the case. I have not isolated it in a large number of cases, but it was not until my second visit to Havana that I differentiated it from the colon-bacillus (*a*) with which it is associated.

“ In my first culture-experiments, made in 1888, I was very much puzzled by the contradictory results which I obtained in inoculating my cultures into rabbits and guinea-pigs. I believe now that the promptly fatal results obtained in certain cases in which I injected cultures which I supposed contained only bacillus *a* were due to the presence also of my bacillus *x*.”

Sanarelli has not found his bacillus icteroides in the gastro-intestinal contents. He says :

“ Finally, as the result of my observations, that the bacillus icteroides is found in the circulating blood and in the interior of the tissue, and that it is never found in the gastro-intestinal contents, it must be held, contrary to what is at present supposed, that the virus of yellow fever does not reside in the digestive tube, and that therefore its poison, instead of being absorbed through the intestinal walls, is manufactured in the interior of the organs and in the blood itself.”

We have already seen that Sanarelli was able to demonstrate his bacillus in only 58 per cent. of his cases, and the following quotations indicate that the number of his autopsies was but eleven. He says:

"I believe it superfluous, then, to recount the ways by which I arrived at the recognition of the microbe of yellow fever; I owe this good fortune to the second case of yellow fever I met with in the Island of Flores. This case presented in a state of reflected purity the specific microbe to which I subsequently gave the name, not altogether proper, but sufficiently expressive, of '*bacillus icteroides*,' because yellow fever is also called icteroid typhus.

"I have said in a state of relative purity, because yellow fever presents the prototype of diseases with mixed infections. In the eleven necropsies that I made I have never met with the bacillus icteroides alone; it was at least associated with the coli bacillus, staphylococci, or the streptococcus. In the second case, at the Island of Flores, it was only associated with a small quantity of coli bacilli, and in the eighth, studied at Rio Janeiro, with staphylococcus aureus.

"In all other cases I either found it mixed, in a large minority, amongst numerous common microbial species, or I was not able to find it owing to the cadavers being completely invaded by other microbes, which, as we shall subsequently see, after having succeeded, owing to the action of the bacillus icteroides, in invading the organism, eventually injure or cause the total disappearance of the specific microbe."

I demonstrated the pathogenic properties of my bacillus *x* by experiments upon guinea-pigs and rabbits, and found that the rabbit was especially sensitive to its pathogenic action when it was injected into the cavity of the abdomen. Sanarelli says with reference to his bacillus icteroides, "The rabbit is still more sensitive than the guinea-pig to the action of the icteroid virus." It is true that my results do not entirely correspond with those of Sanarelli, inasmuch as subcutaneous inoculations in guinea-pigs and rabbits were not always fatal, but in the inoculations attended with a negative result the amount of culture injected was comparatively small—1 c.cm. to 1 c.cm. Sanarelli says: "In guinea-pigs it produces, in very small or large doses, a cyclical febrile disease which always ends in death after eight to twelve days." I confess that I did not wait so long before recording a negative result, inasmuch as in fatal cases, both in the rabbit and guinea-pig, death usually occurred within forty-eight hours, and in rabbits which received from 1 to 5 c.cm. in the cavity of the abdomen death often occurred in from three to five hours—showing the presence of a very deadly toxin in my cultures. It was this fact that led to the strong suspicion, and at times almost positive conviction, that the bacillus in question was the specific yellow-fever germ. But the experimental evidence did not appear to me to be sufficient, and I refrained from making any positive claim. There had already been several premature announcements (Carmova, Freire, Gibier, Finlay) of the discovery of this long-sought microbe, and having

shown the fallacy of these alleged discoveries I was not willing to take any chances of making a similar mistake. Having failed to obtain this bacillus in my cultures from a considerable number of typical fatal cases of yellow fever, I could not announce it to the world as the specific infectious agent in this disease. If I had obtained the results reported by Sanarelli in his experiments upon dogs, monkeys, and, finally, upon man, I should not have hesitated to do so. If these results are confirmed by other investigators, this bacillus must be accepted as the veritable germ of yellow fever.

Sanarelli says:

“But the animal that lends itself better than any other to exhibit the strict anatomical and symptomatological analogies of experimental yellow fever with human yellow fever is the dog. Injection must be effected by the veins, and the disease-process which results is almost immediately manifested with such violent symptoms and such complex lesions as to recall the clinical and anatomical picture of human yellow fever. The most prominent symptom in experimental yellow fever of the dog is vomiting, which begins directly after the penetration of the virus into the blood, and continues for a long time, as if the animals were under the influence of an energetic emetic. After the vomiting hemorrhages appear, the urine is scanty and albuminous, or there is suppression, which precedes death a little. Once I observed grave jaundice. At the necropsy highly interesting lesions are met with, inasmuch as they are almost identical with those that are observed in man. Above all, the profound steatosis of the liver strikes the attention. The hepatic cells, even when examined fresh by means of a little osmic acid, appear completely degenerated into fat, like those of individuals who die of yellow fever. The amarylligenous toxin is in reality, as we shall see later on, a true specific poison of the hepatic cells, like phosphorus and arsenic. A complete steatosis of the organ can be produced by injecting directly into it, through the abdominal walls, a fresh culture of the specific bacillus. Beside the liver, the renal tissue, which is the seat of an acute parenchymatous nephritis, and which must be considered as the immediate cause of the anuria and the uræmic intoxication, presents a grave fatty degeneration. In fact, the blood of dogs which die of experimental yellow fever contains a quantity of urea equal to that which is met with in animals completely nephrotomized, or in the severest cases of human yellow fever. The whole digestive apparatus is the seat of the gravest hemorrhagic gastro-enteritis that can be imagined; comparable solely to that provoked by poisoning with cyanide of potassium. This hæmatogenous gastro-enteritis is then perfectly analogous to, perhaps more severe than, that which is observed in man. In the majority of cases the bacillus ieteroides is always found in the blood and organs in variable quantities, but in a state of absolute purity. Sometimes, however I found it associated with the coli bacillus and the streptococcus, as in man.

“As I have also observed this tendency to secondary microbial invasions in studying amarylligenous intoxication in dogs, obtained with filtered cultures alone, it must be concluded that the amarylligenous poison either by itself, or through the alterations that it provokes in

the different viscera, and above all in the liver, which, as is known, is universally considered as an organ of defence against microbes, favors the secondary infections in the dog, having perhaps their point of departure in the intestinal canal itself. This constitutes an important point of bacteriological contact between yellow fever in the dog and in man.

"The experiments performed in monkeys also present great interest, inasmuch as they demonstrated the possibility of obtaining in these animals fatty degeneration of the liver, still more grave than that observed in man. In one case the liver was completely transformed into a mass of fatty substance similar to wax. In the monkey, as in the dog and man, the disease frequently ends with the bacteriological appearance of a mixed infection with staphylococcus or streptococcus.

"Goats and sheep are also very sensitive to the ictteroid virus, and the same complex phenomena, indicated as specified in other animals, are repeated in them. Beside the grave fatty degeneration of the liver, which is never absent, nephritis, anuria, uræmic intoxication, and mixed infection are observed. . . .

"My experiments on man amount to five. For reasons readily understood I have not employed living cultures, but simply cultures in broth of fifteen to twenty days, filtered through a Chamberland bougie, and then for greater precaution sterilized with a few drops of formic aldehyd. In two individuals I have experimented on the effects of subcutaneous injections, in the other three the effect of endovenous injections. These few but very successful experiments have been sufficient to illuminate with a truly unforeseen light all the pathogenic mechanism until now so obscure and badly interpreted.

"The injection of the filtered cultures in relatively small doses reproduced in man typical yellow fever, accompanied by all its imposing anatomical and symptomatological retinue: the fever, congestions, hemorrhages, vomiting, steatosis of the liver, cephalalgia, rachialgia, nephritis, anuria, uræmia, icterus, delirium, collapse; in short, all that complex of symptomatic and anatomical elements which in their combination constitute the indivisible basis of the diagnosis of yellow fever. This fact is not only striking evidence in favor of the specific nature of the bacillus ictteroides, but it places the etiological and pathogenic conception of yellow fever on an altogether new basis."

I had no opportunity to make experiments upon man, and my experiments upon dogs were limited to two, which are related in my report as follows:

"BALTIMORE, NOV. 16, 1889—10.30 A. M.

"Injected into cavity of abdomen of small puppy, three months old, 2 c.cm. of a culture of bacillus *x* in aqua coco. At 2 P.M. the dog appeared quite sick and indisposed to move, and continued so during the afternoon. Temperature in rectum at 4 P.M. 104° F. November 17th, 9 A.M., the dog appeared well; temperature 100.2°. November 18th, continued well; temperature 101°. On this date, at 10.30 A.M., injected into the cavity of the abdomen 5 c.cm. culture of bacillus *x* in aqua coco. Temperature at 2.30 P.M. 102.4°. Dog appears lively. Next day apparently well.

"November 19th, 10.30 A.M. Injected into cavity of the abdomen of small puppy, five months old, 1 c.cm. of culture of bacillus *x* in aqua

coco. Temperature just before injection 102.4° ; temperature at 3 p.m. 103.8° ; the animal is evidently sick and lies quietly in its box. November 20th, 10 a.m., seems better, but still quiet; temperature 102.6° . November 21st, jumps about and appears perfectly well."

These experiments were made in Baltimore, after my return from Havana (1889). I could not experiment on dogs in my laboratory in Havana, as it was located in the third story of one of the principal hotels of the city. Possibly my cultures had become somewhat attenuated.

In my experiments upon rabbits I found in one instance a decidedly fatty liver. In my report I say:

"Usually the liver in animals which die within twenty-four hours is full of blood, rather soft, and dark in color. In a single instance I found the liver to be of a light color, and loaded with fat. As the animal was excessively fat and this was an exceptional case, I have not supposed that the observation is entitled to any special weight in estimating the evidence with regard to this bacillus from an etiological point of view."

Possibly I might have obtained evidence of fatty degeneration of the liver in other cases if the animals experimented upon had not succumbed so promptly to the toxic effects of the material injected. With reference to the cause of death I say:

"The rapidly fatal effect in those cases in which I have injected 2 or more cubic centimetres of a culture into the cavity of the abdomen has led me to suppose that death results from the toxic effects of a ptomaine contained in the culture at the time of injection. The symptoms also give support to this supposition. The animal quickly becomes feeble and indisposed to move, and sometimes before death lies helpless upon its side, breathing regularly, but is too feeble to get up on its feet when disturbed. Death sometimes occurs in convulsions, but more frequently without, apparently from heart-failure."

The following experiments show that freezing the cultures does not destroy the vitality of this bacillus:

"February 5, 1890, 10 a.m. Injected into the cavity of the abdomen of rabbit No. 228, weight 775 grammes, 2 c.cm. of culture of bacillus *x* in blood-serum, frozen for two hours in ice and salt mixture. Dead next morning at 8 o'clock. Bacillus *x* in pure culture recovered from liver.

"5th, 10 a.m. Injected into the cavity of the abdomen of rabbit No. 229, weight 810 grammes, 2 c.cm. of culture of bacillus *x* in blood-serum, frozen two hours in ice and salt mixture. Dead next morning at 8 o'clock. Bacillus *x* in pure culture recovered from liver."

The fact that this bacillus is not destroyed by freezing, and that it develops in culture-media at a comparatively low temperature, appeared to me to be opposed to the view that it is the specific infectious agent

in yellow fever, for this disease does not prevail at its endemic foci when the temperature falls much below 20°C . (68°F .), and a freezing temperature is generally believed to be fatal to its "germ." But the interesting observations of Sanarelli relating to its symbiosis with certain hyphomycetous fungi appear to dispose of this difficulty, and throw a flood of light upon many facts relating to the etiology of the disease which have not heretofore received any rational explanation.

It is to be hoped that these observations and the experimental evidence submitted relating to the specific pathogenic action of the bacillus in question upon dogs and monkeys and upon man, may be fully confirmed by further investigations, and that the essential questions relating to the etiology of this pestilential malady may thus be definitely settled. Fortunately, cultures of my bacillus *x* have been maintained continuously since my return from Havana in 1889, and I shall at once resume my experiments upon animals for the purpose of ascertaining whether this bacillus has the specific pathogenic properties ascribed to it by Sanarelli.

DESCRIPTION OF PLATE.

FIG. 1.—Bacillus *x* (Havana, 1889). Smear-preparation from surface of liver of rabbit 274, which died at end of twenty-four hours after receiving in cavity of abdomen 3 cubic centimetres of a bouillon-culture of bacillus *x*. The bacilli are smaller than in recent cultures, but a pure culture was obtained from the peritoneal cavity of this rabbit in which the bacilli had the usual size as seen in Fig. 3. Fuchsin stain. $\times 1000$.

FIG. 2.—Bacillus *x*, from a potato-culture. The potato had an acid reaction and the bacilli are unusually large. The culture was proved to be pure by making gelatin roll-tubes, in which the colonies had the usual characters and the bacilli were of the usual dimensions. Fuchsin stain. $\times 1000$.

FIG. 3.—Bacillus *x*, from single colony in gelatin roll-tube. Fuchsin stain. $\times 1000$.

FIG. 4.—Bacillus *x*, from potato-culture of four days. Fuchsin stain. $\times 1000$.

FIG. 5.—Bacillus *x*, colonies in gelatin roll-tube; three days at 20°C . $\times 6$ diameters.

FIG. 6.—Bacillus *x*, colonies in gelatin roll-tube; forty-eight hours at 22°C . $\times 10$ diameters.

FIG. 7.—Bacillus *x*, culture in flesh-peptone-gelatin; forty-eight hours at 22°C .

FIG. 1.

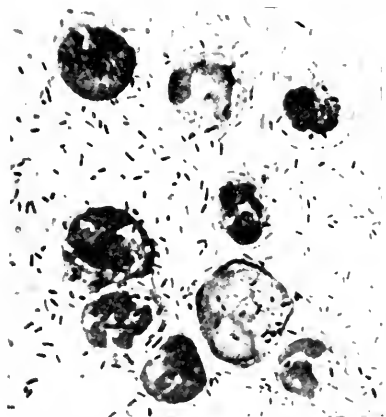


FIG. 2.



FIG. 3.



FIG. 4.



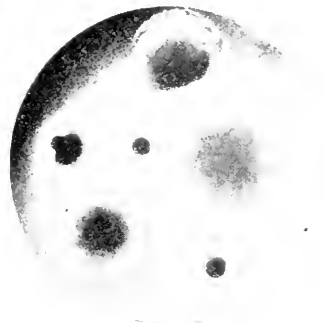
FIG. 7.



FIG. 5.



FIG. 6.



REVIEWS.

APHASIA AND THE CENTRAL SPEECH-MECHANISM. By W. ELDER, M.D.
London: H. K. Lewis, 1897.

MANY valuable contributions on these nervous disturbances have been furnished during the past years by various English physicians of note, and this last essay shows the same high standard of work established by the previous writers. The author is recognized by all students in this line as an able writer and an authority on these questions; and his *Edinburgh University Thesis*, now extended into a volume of 250 pages, is a work of great interest not only to the neurologist, but to every general practitioner who wishes to inform himself on this complicated question. After a careful study of this book and the rules given for the analysis of the lesions producing aphasia in its various forms, a student should be able to make a fairly accurate diagnosis of any given lesion involving the centres controlling speech. The presentation of the subject is so clear and exhaustive that we heartily recommend the work to all those desirous of informing themselves as to the most accurate and rapid manner of analyzing cases of aphasia. There is hardly any branch of neurology which is more complex than the conditions underlying the various forms of aphasia, and as there is much divergence of opinion in regard to these the study of no single work will be sufficient to elucidate the various problems at issue; so that, while saying that no student can go wrong in reading this work, we must add that he should also read others, so as to be able to draw fair conclusions for himself.

After seeing how the very ablest students in neurology differ in their explanations of "speech-mechanism," it is hardly fair to criticise such a work as Dr. Elder's. As yet, we cannot say who is right or who is wrong. Much of this divergence of opinion, we think, is due in greater or in less measure to the unsatisfactory reports of many cases of aphasia from which one student with a leaning toward one idea draws one conclusion, while another student with a different leaning comes to another determination. The subject is so complicated that it is only from the most accurately reported cases that any fairly exact inferences can be drawn. In spite of these differences of opinion, it is interesting to compare this work of Dr. Elder's with the Lumslean Lectures, by Dr. H. Charlton Bastian, on "Some Problems in Connection with Aphasia and Other Speech-defects," which have just appeared in the *British Medical Journal*. Dr. Bastian has long been a writer on this subject, and his papers have always been important and valuable. He does not take up the subject of "Aphasia" so fully as Elder, but practically limits himself to lesions of the cortex inducing this trouble, and only incidentally takes up the effects of lesions of the commissures between the different word-centres. He differs very materially from Elder on

certain important factors in the study of these lesions, and as these factors cannot be entirely determined by experimental or clinical evidence, but must forever depend more or less on philosophical reasoning, the difference of views is but natural. Elder follows in his work the well-known diagrams of Lichtheim for the explanation of lesions producing the various forms of aphasia; but, with certain views of his own, makes these still more complex. An ideation-centre is held to by Elder, following Lichtheim's lead, but as the latter himself says in explaining his diagrams, "this has been done for simplicity's sake," and he (*i. e.*, Lichtheim) does not "consider the function [ideation] to be localized in one spot of the brain, but rather to result from the combined action of the whole sensory sphere." Bastian does not believe in a centre of conception or ideation, but thinks that acts performed by such a centre, as some suppose, are carried out by simultaneous activity of different perceptive centres, and compares these with the "association-areas" of Flechsig, large and most important areas so interestingly described by this author in his "*Gehirn und Seele*;" in the notes to this paper there is also a paragraph on aphasia which should be read in association with Elder's and Bastian's papers. Bastian's ideas are formulated on a scheme of four main centres for speech-mechanism, an auditory, a visual, and two kinæsthetic, a glosso- and a cheiro-kinæsthetic, centres. The glosso-kinæsthetic centre is the centre of memory of the different groups of sensory impressions resulting from the mere movements of the vocal organs during the utterance of words (impressions from the muscles, mucous membranes, and skin); in other words, kinæsthetic impressions corresponding with the articulation of different words, and this centre corresponds closely with Broca's. The cheiro-kinæsthetic centre is the centre for the memory of the different groups of sensory impressions emanating from muscles, joints, and skin during the act of writing individual letters and words, and this centre is in the posterior part of the second frontal gyrus. These four perceptive centres are connected with four annexes, like the above-mentioned "association-areas" of Flechsig. Whether one ideation-centre, as conceived by Elder and others, or various areas of association is the simpler method of explanation of concepts, must be left to each student to settle for himself. It is hard to imagine the localization of an ideation-centre being accurately determined, for, as Max Müller says, as quoted by Bastian, "though sensations, percepts, and concepts may be distinguished, they are within our mind one and indivisible. We can never know sensations except as percepts; we can never know of percepts except as incipient concepts." It is impossible to do justice to either or both Elder's and Bastian's work in the space at our command. Many interesting problems present themselves for discussion—one of the primary ones being, Why is the left hemisphere of the brain the most important for the execution of speech? It is now generally granted that almost all the functions of the left hemisphere may be exercised by the right in case of injury to the left, with greater or less proficiency, and there is no good explanation for the work of speech being assumed by the left hemisphere unless it be that of Moxon, who suggested that the call upon attention was so great for the production of the extremely elaborate movements concerned in speech that the necessary concentration of attention would be much facilitated if this process of education were limited to one hemisphere.

There is one point in the consideration of "aphasia" which is not

dealt with by either Elder or Bastian, and which is of special interest to the general practitioner. This is the question of the power of will-making by aphasics, and the matter has just been most admirably handled by Bramwell in the *British Medical Journal* for May, 1897. The paper should be read by all who wish to be masters in the subject of aphasia, as will-making by patients suffering from any of the various types of aphasia is a problem requiring very careful study on the part of the physician in charge of the case.

The study of these papers increases our feeling of the necessity that the terminology of nervous lesions, diseases, and centres should, if possible, be revised and a new nomenclature be adopted so as to simplify the confusion which now necessarily exists, due to the difference of terms used and the constant creation of new ones which, as time goes on, only adds to the difficulty of any future revision.

The publishers deserve praise for the manner in which they have brought out Dr. Elder's work, which is in all respects satisfactory. American publications of medical books are not, as a rule, so neatly gotten up. R. N.

UEBER TRAUMATISCHE ENTSTEHUNG INNERER KRANKHEITEN. KLINISCHE STUDIEN MIT BERÜCKSICHTIGUNG DER UNFALL-BEGUTACHTUNG. VON RICHARD STERN, Privat-docent an der Univ. Breslau. Erstes Heft. Krankheiten des Herzens und der Lungen. Jena: Gustav Fischer, 1896.

THE TRAUMATIC ORIGIN OF INTERNAL DISEASES. CLINICAL STUDIES WITH REGARD TO EXPERT OPINIONS IN ACCIDENTS. By DR. RICHARD STERN. Part I. Diseases of the Heart and Lungs.

THE possible relations of traumatism to internal disease are often important, yet hitherto no critical exposition of the subject has been available. It must therefore be a cause for congratulation that Dr. Stern has taken up this subject. From his previous work in clinical medicine, and his position as referee for the German Railway Accident Insurance Bureau, his qualifications for the work are unexcelled. Dr. Stern has made no attempt to compile a large number of cases, but has wisely selected the most instructive he could find, and has added many original observations. That the work is written with reference to the State accident insurance system of Germany does not lessen its value as a contribution to pathology.

The volume begins with some remarks of a general kind on the direct and remote consequences of traumatism. These are, as regards the first, local or general alterations of the circulation, disturbances of the nervous system, including shock, and alterations of the functions of affected organs. The second category includes inflammation, degenerations, tumors, infections, and functional disturbances.

Diseases of the heart and thoracic aorta are then considered. An important point is emphasized in the beginning, viz., that the most severe injuries of the heart, even to complete rupture, may occur without any evidence of traumatism of the thoracic wall. The relations of injury to infectious endocarditis, to ruptures of valves, to lacerations of the muscle, followed by cardiac aneurism or by fibrous myocarditis, are

all discussed very thoroughly. In connection with the nervous affections of the heart psychic trauma is mentioned as an important factor, beginning with actual death from mental excitement. A case is cited in which death occurred during preparation for an operation deemed necessary after an accident. The verdict was cardiac failure (Herzschlag) as the result of mental excitement and fear of the operation, "the death being the indirect result of the accident." Very interesting is the reference to the development of arteriosclerosis after accident. The discussions of pericarditis and of thoracic aneurism are also of much interest. A valuable chapter is the one on the Aggravation of Heart-diseases by Accidents, either through Psychic or Mechanical Excitement or from Exertion.

Traumatic hæmoptysis begins the second section, and is systematically considered as regards cause, diagnosis, and prognosis. The bleeding in itself is not of bad prognosis, but the blood in the respiratory passage may become a suitable soil for the growth of microbes, or the torn lung may permit the entrance of germs into parts previously not infected. The acute inflammatory diseases of the lung following injury are well described as internal wound-infectious diseases. "According to the quality of the infection and the predisposition of the injured individual, a pneumonia, gangrene, abscess, or tuberculosis will occur." This idea is, of course, not original; but it is important because some recent writers have attempted to separate traumatic lung-affections from others. Croupous pneumonia is described with especial fulness. Pneumonia in consequence of injuries of distant parts of the body, especially after injuries of the head and general concussion, is also fully described.

The chapter on Traumatic Pulmonary Tuberculosis is especially important. Here the relation of the injury is difficult to fix. The causal relation of injuries of the joints and testes to tuberculosis is generally admitted by surgeons, but it would seem as if in such cases the injuries were mild ones. F. Krause thinks this can be explained by the fact that in severe injuries the reparatory processes are so active that the tubercle-bacilli cannot resist the healing process, whereas milder injuries set up favorable local conditions for their growth. In the case of the lung, however, it is much more difficult than in that of the bones and joints to know whether there was an infection before the trauma. In all cases of injuries of the lung, therefore, it seems especially important to search for evidences of previous disease and to make frequent examinations afterward; for obvious reasons such cases should not be placed in wards where they may be exposed to tubercular infection.

The author admits the possibility of tumor-formation after injury, but draws no conclusions from the literature. The various forms of pleurisy and their relation to injuries are all considered. The effects of injury on existing disease of the lungs and pleura are briefly described.

Numerous references are scattered through the text and systematically arranged at the end of each section.

From this brief summary the interest and value of Dr. Stern's work must be apparent. It will be valuable not only to experts in accident-cases, but as a pioneer work of its kind will be a necessary guide for the clinician and the pathologist. It is to be hoped the continuation will soon appear.

G. D.

HANDATLAS DER ANATOMIE DES MENSCHEN IN 750 THEILS FARBIGEN ABBILDUNGEN MIT TEXT. Mit Unterstützung von WILHELM HIS, Professor der Anatomie an der Universität Leipzig; bearbeitet von Werner Spalteholz ao. Professor an der Universität Leipzig und Custos der Anatomischen Sammlungen. Erster Band, 2. Abtheilung, und Zweiter Band, 1. Abtheilung. Leipzig: S. Hirzel, 1896.

HANDATLAS OF HUMAN ANATOMY. By WILHELM HIS.

THE increasing interest in human anatomy is evidenced by the multiplicity of anatomical textbooks which each year brings forth. Any work on anatomy bearing the name of His, either as author or collaborator, must of necessity not only command attention, but must also be of unusual interest.

Since the acquisition of anatomical knowledge depends so largely upon impressions conveyed to the student's mind through the visual sense, especial importance must attach to the various methods of illustrating the subject. The great problem that confronts the maker of anatomical pictures is to present the parts in a faithful and accurate light, and at the same time to give to his representations such clearness and sharpness as to detail as shall make them easily intelligible to the student. Readers of current anatomical textbooks know—though possibly not all of them fully appreciate—how this problem is usually solved. The majority of extant anatomical pictures are diagrams rather than pictures. It may be urged by some, that for didactic reasons a clear-cut, diagrammatic drawing is preferable to a faithful representation of structures as they actually exist. Just what compromise should be made between ideally correct diagrams and true pictures is a nice question. How far photography as a basis for anatomical illustrations may be made practically available seems not as yet to have been fully determined.

The use of colors in the making of illustrations greatly enhances their value. Colored plates unquestionably lend fascination to a book, partly, perhaps, by virtue of their comparative novelty, but more, no doubt, because the individuality of each structure depicted is thereby accentuated.

A careful inspection of the work under consideration suggests that photography may have been employed in many cases to furnish the groundwork of the pictures, the photographs being elaborately reworked to bring out the details more sharply. Especially does this seem to be true of the illustrations of joint-anatomy.

The second part of the first volume (Erster Band, 2. Abtheilung) deals with the articulations of the upper and lower extremities and of the pelvis. It occupies fifty-eight pages and includes fifty-two plates. Nine of these plates are representations of sections of the bodies of the vertebrae and of parts of some of the long bones; the remaining forty-three plates illustrate the articulations.

A careful examination of this fasciculus of the *Atlas* reveals little to criticise and much to commend. If, in many cases, a somewhat too artificial representation of the structure of the ligaments is given, this is a minor defect. The plates are anatomically valuable and artistically beautiful. Each articulation is shown from as many points of view as may be necessary thoroughly to elucidate its characteristics. The bony sections are exceedingly well depicted.

The first part of the second volume (Zweiter Band, 1. Abtheilung) is concerned with the muscular system. This fasciculus comprises 177

pages, with 128 plates. As a preliminary to the exhibition of the various groups of muscles, five plates are presented, showing, collectively, the division of the entire surface of the body into different regions, the areas being outlined in red. The natural superficial elevations and depressions are used as the basis of both the apportionment and the naming of the regions.

The muscles are illustrated very thoroughly. Groups of muscles and individual muscles are shown from several points of view in every case where such multiple representation can contribute to clearness and completeness.

It is in this part of the *Atlas* that the use of color in the plates produces the most striking effect. In some instances the color seems not to have been thoroughly well managed, since such flat muscles as the thyrohyoid, the sternothyroid, and the hyoglossus are given unnatural rotundity. Again, the deltoid, as shown in a lateral view, appears quite flat, and the representation of its fibres in the same picture is entirely artificial. A curious fault of drawing shows the sectional surface of the rectus abdominis as the section of a cylinder, instead of that of a flat muscle; this error appears in two pictures of the rectus.

The illustrations of the face-muscles present a decided departure from the conventional diagrammatic pictures to which the readers of anatomical textbooks have been accustomed. The showing of certain muscles isolated from their related structures, thus setting forth clearly and strikingly their general form, position, and bony attachments, is an admirable feature of the *Atlas*. For example, the cuts showing the pyriformis and the internal and external obturators, with the related bones divested of all other tissues, illustrate these muscles more effectually than could possibly be done otherwise. Many other muscles, as the temporal, the masseter, and the pterygoids, are shown in the same way. Indeed, but for the impracticable multiplication of illustrations, this would be the ideal method of representing very much of the muscular system. It must be evident to any teacher of anatomy that the attachments of muscles constitute one of the greatest of bugbears to the medical student, and this is due largely, no doubt, to the fact that, in the dissections and in the pictures he sees, their origin and insertion are seldom a prominent feature.

The plates show extreme neatness of execution and produce a good general effect; they are, moreover, of great teaching value. The use of a small cross at the end of each leader to show unmistakably what it is meant to indicate, being an aid to the eye and economizing the attention of the reader, is a distinct advantage and greatly facilitates the use of the plates.

The text of the *Atlas* possesses conciseness and terseness without tantalizing brevity. As announced by the author, the new German anatomical nomenclature has been followed. A praiseworthy preference is given in many cases to names that are descriptive of structures rather than memorial of individuals. The term *inguinal ligament* is more significant than *ligamentum Pouparti*, and *ligamentum lacunare* than *Gimbernat's ligament*. Terms, too, that are more accurately descriptive are preferred to older and sometimes misleading names. The *supinator longus* is more appropriately designated the *brachio-radialis*, since it is as much a pronator as a supinator. The distinction between the *external* and the *internal abdominal rings* becomes at once obvious when they are

called respectively the *subcutaneous inguinal* and the *abdominal inguinal rings*. The terms *medial* and *lateral lumbo-costal arches* are more significant because more descriptive than *internal* and *external arcuate ligaments*. The expressions "internal" and "external" as indicating relations upon the extremities, so often the source of confusion to the student, are supplanted respectively by the more exact terms "medial" and "lateral." *Ligamentum sacrotuberosum* and *ligamentum sacro-spinosum* are more exactly descriptive than *greater* and *lesser sacro-sciatic ligaments*. So, too, it is more correct to call the *ligamenta alaria* of the knee-joint the *plicæ alares*, and the *ligamentum mucosum* the *plicæ synovialis patellaris*.

Other, though possibly less advantageous variations from the nomenclature of English-speaking students of anatomy are, *serratus anterior* for *serratus magnus*; *fossa ovalis* for saphenous opening; *lumbodorsal fascia* for lumbar fascia, and *reflected inguinal ligament* for triangular ligament of abdomen. Almost any movement for reform, however, is apt to run mad, and for this reason defeats itself; it is usual, therefore, that the great number of changes suggested in any attempted reform of nomenclature proves a bar to their general adoption.

The *Atlas* is a valuable contribution to anatomical literature and should be especially helpful to the student. The work is printed on excellent paper, and, with the colored plates, is exceedingly attractive.

J. C. H.

DISEASES OF THE EYE, A HANDBOOK ON OPHTHALMIC PRACTICE FOR STUDENTS AND PRACTITIONERS. By G. E. DE SCHWEINITZ, M.D. Second edition, thoroughly revised. Philadelphia: W. B. Saunders, 1896.

IN the first edition of this book, published in 1892, the part which dealt with General Optical Principles, Normal and Abnormal Refraction, and Motility was contributed by Dr. James Wallace. The revision of this portion has been intrusted to Dr. Edward Jackson, who is likewise responsible for the section on Retinoscopy. The form in which these special contributions are cast is quite in keeping with the method and symmetry conspicuous throughout the whole book, and demands no special mention except for the sake of giving due credit to these collaborators for what has been done by them.

To have read either the first or this second edition, as a whole, is to have taken account of stock. Certainly the student or the practitioner, whom necessity or special tendency has banished from the commanding position occupied by the author of this handbook, will not study its pages without being duly rewarded. The aims and resources of the art are here exhibited in systematic form. There are practically no gaps and no redundancies. There are 640 pages and an index, but there is no padding. The illustrations, as usual, are culled from many sources, but a goodly number have been especially prepared. Whether original or borrowed, they fulfil their proper function in the economies of thought-transference. The personality of the author is not obtrusive. He occasionally sits in judgment, and he does not hesitate to express an opinion or assert his position in the discussion of open questions; but there is little argument in the book, and no dogmatism. The volume is

chiefly expository, and passing, chapter by chapter, along the aisles of this educational exhibit, one sees, as it were, the ophthalmological situation and the ophthalmological armament to date. The author has been especially careful and instructive in matters of detail and technique, and for this both student and practitioner have reason to be thankful. Where differences of opinion exist among representative men, in the brief expositions here given one finds no undue prejudice or unfair silence, and the summing up that follows is quite likely to give evidence of more than ordinary sagacity. In proof of this one may refer to the remarks made on the operative treatment of glaucoma, or on the ripening of immature cataract.

It is a little shocking that the theory of color-vision is touched upon so lightly, as on page 482. But think what a harlequin of dilemma a fair consideration of this rapidly growing subject would involve. There is a beautiful arena, but the heroes and their provisional theories are disappearing before a "Donnybrook" of "unclassed talent." Quite as well, perhaps, to wait for organization—and a third edition.

One may find a little fault with any good book, and good and bad qualities are occasionally correlated necessities. Will you insist on the beautiful illustrations? You must take also the shiny paper. Do you commend the author that he frankly admits that uncertainties still exist, and that he fairly states the open questions? Then you must not complain that he sometimes expects his student to stand alone. Do you think that a working knowledge may be acquired more quickly from a book less fair and full, more dogmatic and impressive, giving always a single course with no alternative? It may be so. An English critic, not long since, said of a book resembling this in many respects and written also in Philadelphia, that it was charming reading to him who knew it all before, but that it required an amount of ability which to the novice was prohibitive. The criticism was unjust, for that book, like this, is well written for the student who is willing to think, and we are glad to notice that the student of ability is receiving recognition here in America and that "the wise as well as the witless may have" their ophthalmologies.

It is a gentlemanly thing to have produced as elegant and comprehensive a treatise as this book of Dr. de Schweinitz. The student may take it both for an introduction and for a foundation, and the practitioner may read it with pleasure, and feel that, having read, he has given old fogysm the go-by for another five years.

UEBER EIERSTOCKSTUBERKULOSE. VON DR. J. SCHOTTLAENDER, Privatdozent an der Universität Heidelberg. Mit vier lithographischen Tafeln.

TUBERCULOSIS OF THE OVARY. By DR. J. SCHOTTLAENDER, Privatdocent at the University of Heidelberg. With four lithographic plates. Pp. 169. Jena: Gustav Fischer, 1897.

THE purpose of the author, as explained in the introductory section of this monograph, is to throw more light upon this subject by the aid of experiments on animals, no less than 1500 preparations having been

made, mostly from rabbits. His technique was briefly as follows: the abdomen having been opened under the strictest aseptic precautions, the ovary was punctured with a fine sterilized needle, and was inoculated deeply within its substance with tuberculous material carried in the point of a second needle, or in a fine tube. After a sufficient length of time had elapsed the animal was chloroformed, the genital organs removed and transferred at once to the hardening fluid. Minute details are given regarding the methods of hardening, staining, and examining sections. Section II. is devoted to detailed descriptions of the anatomical condition in a series of cases.

In the third division of the book (pages 46 to 157) the author discusses at length the results of his studies, viz., in Chapter I. the effects of the artificial trauma; in Chapter II. tubercle-bacilli and their relation to the tissues; in Chapter III. the history of the different cell-forms; in Chapter IV. the structure and history of the tuberculous foci; while in Chapter V. the progressive and retrograde changes in the cell-nuclei are studied. The concluding chapter of this section is devoted to the course of tuberculous infection in the genital tract, especially in the ovaries. Plates of unusual excellence are appended, with a full description, and in addition an exhaustive bibliography.

The author's deductions are most interesting and suggestive. He found that in the rabbit an intense tuberculous infection of the ovary occurred only when the ovary itself was deeply inoculated. When the tube alone was inoculated in the manner described a few granulation-cells were occasionally found in the corresponding ovary, but only remains of bacilli (bacillentrümmern) were seen in the stroma. Superficial inoculation of the ovary was always followed merely by the development of groups of granulation-cells and scattered giant-cells.

To the special student this monograph will commend itself as a thorough and scholarly work, which will repay careful study. H. C. C.

LECTURES ON THE TREATMENT OF FIBROID TUMORS OF THE UTERUS, MEDICAL, ELECTRICAL, AND SURGICAL. By FRANKLIN H. MARTIN, M.D., Professor of Gynecology, Post-Graduate Medical School of Chicago; Surgeon, Woman's Hospital, of Chicago; Gynecologist, Chicago Charity Hospital and the Post-Graduate Hospital, etc. Pp. 174. Chicago: The W. T. Keener Co., 1897.

This little book, including ten lectures, deals with a large subject, and is necessarily much condensed. While it contains no facts which are new to the specialist, it is an excellent *résumé* of the development of our knowledge of fibroids and their treatment during the past decade.

The first two lectures deal with the history and anatomical changes in fibroid tumors, and diagnosis; the next two with medicinal treatment, especially the use of ergot. Electricity is considered at length in Lecture V., the author's deductions being fair and judicious, as shown by his emphasizing the fact that the cure is symptomatic. Lecture VI. on surgical technique and the preparation and after-treatment of patients is interesting and valuable, as giving the results of the writer's personal experience.

Twenty-four pages are devoted to his favorite operation of ligating the uterine arteries per vaginam, with reports of thirteen cases.

A careful description of Hegar's operation is given in Lecture VIII.; the author's experience with the procedure seems to have been more favorable than that of most surgeons.

Vaginal hysterectomy is discussed in Lecture IX., and abdominal in the concluding lecture, the description of operations being clear, concise, and fairly well illustrated. The author's style is pleasing, and he possesses the faculty of condensing a large amount of information in a paragraph, without sacrificing either the clearness or the readableness of the book. We commend it as an excellent epitome for the post-graduate student.

H. C. C.

CHARAKA-SAMHITA. Translated into English and published by ABINASH CHANDRA KAVIRATNA, Editor of *Susruta-Samhita*, and of *Chikitsa-Sammālani*; Practitioner of the Hindu System of Medicine. Parts III. to XVI. inclusive. Pp. 89 to 508. Calcutta, 1892-'97.

PARTS I. and II. of this work were reviewed in this JOURNAL for November, 1892. At that time we expressed our admiration for the accurate medical knowledge gained by empirical methods, and believed that the excellent translation would not only place in the hands of English-speaking people information which was believed not to exist at the date assigned (A.D. 775), but which might be useful even at the present time. We have read the different parts as they have appeared with interest and profit, and what came to us as a revelation of facts ascertained by observation has challenged admiration for the high grade of knowledge attained in the infancy of science, or, as the younger graduate probably believes, before medical science existed. This book convincingly shows that many remedies recently lauded as new are merely rediscoveries. Further than this it is evident that the human mind has remained unchanged as regards its logical faculty, for in spite of comparatively limited knowledge, and that diffused over small areas, the physicians then had troubles of their own. Of charlatans we read (pp. 408 *et seq.*): "This is their special indication, viz., clad in the robes of physicians and indulging in self-praise, they walk along the public streets in expectation of calls. When they hear of anybody's illness they run toward his neighborhood, and in the hearing of that person's friends loudly proclaim their own skill and accomplishments as physicians. These men frequently proclaim the shortcomings of the person whose treatment they take up. They wish to win over the friends of the ailing person by doing what would gladden them, by stories and conversation, and various small services. They proclaim their own disposition to be pleased with a very little remuneration. Obtaining a case for treatment, they constantly keep their eye on all things, desirous of concealing their ignorance by dexterity. Beholding that the last stage has come, they fly away, leaving the patient's presence and repairing to some other place." The methods of quacks have not been improved upon during the past twelve centuries. Not only do we find much every-day philosophy, but as well the medical facts are well worthy of

careful consideration. Of especial interest in the recent parts are the three means for ascertaining disease, which are presented at length (pp. 494 *et seq.*): instructions of the inspired, observation, and inference. The matters about which the inspired lay down instruction are discussed, then those which are apprehended by observation, and finally those which are to be ascertained by inference, and the manner in which they are to be known. These matters might well be studied by the modern author, to the end that his reader may be a "physician, conversant with both diagnosis and treatment, who is never at a loss to achieve success." Extended acquaintance with the work confirms in all particulars the commendation hitherto expressed, and we hope that the translator will receive sufficient encouragement to carry on his work to completion, thus earning the thanks of the liberally educated physician. R. W. W.

PRACTICAL HANDBOOK OF THE DISEASES OF THE EYE. By CHALMERS WATSON, M.B., C.M., Ophthalmic Surgeon Marshall Street Dispensary, Edinburgh. With nine colored plates and twenty-four illustrations in the text. New York: The Macmillan Company, 1897.

THIS little book, of 250 12mo. pages, well occupies the place for which its author designed it, that of a clinical *vade-mecum* and an introduction to standard works on ophthalmology. It shows, what is rare among books of its class, very thorough working over of the material it contains into definite shape, that will help to fix it in the memory and make it convenient for quick reference.

It is divided into twenty-two chapters, and each chapter is divided by headings, subheadings, and lettered paragraphs. Thus, in Chapter VIII., Diseases of the Iris and Ciliary Processes, we find the headings Structure and Innervation of the Iris, Serous Iridocyclitis, Cyclitis, and Sympathetic Ophthalmitis. And under this last we have first a definition, then as subheadings: Causes, Clinical Features, Theories of Occurrence, Treatment, and Guiding Rules for Enucleation. The selection and arrangement of type have been such as strongly to emphasize this systematic arrangement of the matter.

In regard to the matter itself, nothing original could be expected in a work of its scope. But it is clearly the selection of one who has done extensive and careful reading, and who has had good clinical training, but who has not had the opportunity to sift what he has read and heard by extended personal experience.

The nine colored plates, representing different conditions of the fundus as revealed by the ophthalmoscope, are a unique feature in a book of this class; and although extremely simple and rather diagrammatic, they are well executed, and probably will prove very instructive to the medical student, to whom such representations are of more value than to ophthalmologists who have become acquainted with the appearances they are intended to represent, and who, therefore, are more conscious of the defects of all such representations. E. J.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Angina Pectoris Treated by Erythrol Tetranitrate.—DR. J. B. BRADBURY reports a single instance of the successful use of this remedy. The patient, a medical man, states that life was rendered infinitely more tolerable, and the potency of the remedy having been abundantly demonstrated, he took it steadily at about eight hour intervals, in grain doses, as a prophylactic. For three days there was immunity from attacks, although some weariness and oppression would come on after a lapse of six or seven hours after taking the tablets. By making use of four doses daily he hoped to “keep the foe at bay altogether.” The initial fall of tension depends upon the mode of administration. If the formula—drug, one grain; alcohol, one drachm; water, seven drachms—be used, the pulse-tension begins to fall in from two to three minutes; if given in pill-form and swallowed, the time is from twenty to forty minutes; if taken in tablet-form and masticated, the time lies somewhat between the two, and the last-mentioned form is the best. The alcoholic solution sometimes irritates the stomach. This drug was not introduced for the purpose of replacing amyl nitrite and nitroglycerin in cutting short attacks which have developed, but only to replace them in preventing the onset of the attacks. This instance shows that it is capable of doing this much better than nitroglycerin, the best drug which we have hitherto had for this purpose.—*British Medical Journal*, 1897, No. 1893, p. 907.

The Action of Substances of the Digitalis Series on the Circulation in Mammals.—DR. ARTHUR R. CUSHNY has conducted an elaborate investigation. The apparatus used was that of Roy and Adami, artificial respiration being supplied for small animals by an air-pump and Runne's interrupter, while for large dogs the ordinary hand-bellows were made use of. In cats the poison was injected by the jugular, in dogs by the saphenous vein, gener-

ally in 0.1 per cent., in some cases in 0.2 per cent. solution. Most frequently strophanthus was used, but several experiments were made with digitalinum verum, antiarin, digitalin, erythroplein hydrochlorate, and convallamarin. The action of all of these on the cardiac muscle is identical in kind, although varying in strength. Thus digitalinum verum and erythroplein proved to be the weakest of all, while antiarin and strophanthus were the strongest, and convallamarin and digitalin occupied an intermediate position. It has been shown that the different members of this series probably diverge considerably in the strength of their vascular as compared with their cardiac action. They also differ in the relative degree to which each acts on the inhibitory apparatus and the cardiac muscle. Thus erythroplein undoubtedly acts less on the cardiac muscle and more upon the vagus centre than any of the others examined. During the stage of vagus stimulation with strophanthus there was a slowing, due entirely to the inhibitory apparatus, and this is altogether absent in hearts in which this has been paralyzed by atropine, and there is an increase in systole, which undoubtedly is due to direct action upon the cardiac muscle. The muscular action of digitalis extends to the auricle as well as to the ventricle, although in the former it is often concealed, owing to the inhibitory mechanism having more influence on that division of the heart, and there opposes it more directly than in the ventricle. In some cardiometric tracings from the cat's heart under these drugs the systolic volume of the heart actually decreased, while in others it remained practically unchanged, and in others (more especially with erythroplein) a rapid increase in the total amount of blood contained in the heart at the end of the ventricular systole manifested itself. In one set of observations the increased completeness of ventricular systole was evidently sufficient to compensate for the increase in the residual blood of the auricle, or possibly these may have been cases in which the muscular action was equally marked in the auricle and ventricle. In the last there is no doubt that the ventricular contraction was increased, but this was masked entirely by the increase in the residual auricular blood. The "contraction volume" or output of the ventricles per beat is uniformly much increased, whether slowing of the rhythm is marked or not. This is, of course, due to the increased systole, aided in some cases by an increased dilatation of the ventricles. In regard to the amount expelled per unit of time, the results varied a great deal, according to the extent to which slowing of the rhythm occurred. In those cases in which the change of rhythm was but slight the blood expelled in ten seconds was distinctly augmented, while in other experiments in which more marked slowing occurred the output, although at first increased while the retardation was slight, later became practically normal, and still later, when extreme slowing set in, sank below the normal. The increase in output may be very considerable, amounting in some cases to 50 per cent., and between this and a decrease every gradation may be met with. In the irregular or periodic stage of the heart's action the cause is to be found in the increasing irritability of the cardiac muscle, with or without the antagonistic inhibitory mechanism coming into play. Similar features occur in the later stages of poisoning with other drugs, such as aconitine. The results of the cardiometric tracings throw considerable light upon the cause of the increased blood-pressure in the first stage. From these it is seen that the

amount of blood thrown out by the heart per unit of time may vary considerably under digitalis. Except, however, in cases where the slowing is very marked indeed, the output is increased, although this increase may be comparatively small, and seems insufficient to account for the marked rise in pressure. The output is the only factor by which the heart can influence the mean blood-pressure tracing. Increased force of contraction can only possibly increase the size of the individual beats, the mean pressure remaining unchanged. The discrepancy between the effect of the increased output and the actual blood-pressure observed must be ascribed to some other agency than the heart—*i. e.*, to the peripheral bloodvessels. In the second stage, as the irregularities become more marked, the pressure generally falls, owing to the increasing inefficiency of the heart's action. From a practical standpoint, the beneficial effects of digitalis in quickening the circulation are in the main due to its direct cardiac action. Since it increases the resistance to the passage of blood through the lungs to a very much greater extent than strophanthus, it might be expected that in dilatation of the right heart from emphysema the latter would have more beneficial effects than the former. In pneumonia the action of digitalis is rather in improving the nutrition of the heart by increasing its output and the rapidity of the circulation, and not to any special action on the right side.—*Journal of Experimental Medicine*, 1897, No. 3, p. 233.

The Relative Value of Digitalis in Organic Valvular Disease of the Heart in Children.—DR. H. A. HARE, although not doubting the usefulness of digitalis in the heart-lesions of children, believes that it must be given even more guardedly than in the case of the adult, and not uncommonly fails to do good. This failure seems to depend upon the fact that cardiac arrhythmia develops, and signs of auricular distention appear, so soon as enough digitalis is given to maintain the improvement desired. To such an extent has this been the case that he has almost entirely given up its use in persons under puberty, and resorts to strophanthus in heart-lesions and alcohol in heart-failure resulting from the fevers, such as pneumonia. From the reports of eight well-known physicians the conclusion seems to be in favor of digitalis as a cardiac tonic in the valvular diseases of children, although the author still believes that its use should be more cautious and that cases will be met with more frequently in which the drug will fail to act satisfactorily than in the adult. Some years ago he called attention to the value of strophanthus as a substitute. Of eight replies to the question whether strophanthus had done well in such patients, two were in the affirmative and three observers placed it after digitalis.—*Therapeutic Gazette*, 1897, No. 4, p. 227.

[One correspondent, while giving a negative answer, evidently offers the proper explanation for the failures of the others when he stated that perhaps a poor quality of the drug had been used.—R. W. W.]

The Heart-changes from Baths and Gymnastics.—DR. TH. SCHOTT makes use of the Röntgen rays to prove what has been so many times asserted—that under the use of the carbonated saline baths at Nauheim, and the special form of gymnastics there employed, the size of the heart is diminished.

Diagrams of two cases are presented, showing that a reduction of cardiac area really takes place, but more marked and more permanent from gymnastics than from the baths.—*Deutsche medicinische Wochenschrift*, 1897, No. 14, p. 220.

[Owing to errors in employment of the x-rays the actual reduction in size of the cardiac area as projected upon the plate is much less than here appears, as a very elementary knowledge of mathematics would show. These errors have been pointed out by Satterthwaite. It would have been interesting to know if this decrease of size is not partly accounted for by the more complete emptying of the ventricles, a point apparently overlooked by the author.—R. W. W.]

Eucaine.—DR. G. SCOGNAMIGLIO reports as follows: (1) The anaesthesia produced by this anaesthetic is more complete and lasts longer than that of cocaine. There is no mydriatic action nor any disturbing influence upon accommodation, and, further, it is indubitably less toxic. In ten cases of diseases of the nose and throat an 8 to 10 per cent. solution was used. The results excelled those of cocaine. The anaesthesia developed rapidly and extended over a large area. Perlati has reported that in dental practice he found that complete anaesthesia is effected, and teeth can be extracted quite painlessly; nor did he meet with any toxic symptoms. In ophthalmic practice it was employed in fifteen cases, and the anaesthetic effect was found to be distinctly preferable to that of cocaine, with the exception of a few cases where a subcutaneous ischaemic action is desired. Of fifteen cases of minor surgery, in two only was it necessary to repeat the injections (10 per cent.) on account of the lengthy operation.—*The Therapist*, 1897, No. 4, p. 33.

DRS. LEGNER and LIHOU have found that this substance produces a slight slowing of the pulse, but the blood-pressure is unaltered. To reduce the latter large doses are necessary, the animal dying from respiratory paralysis. As regards its safety, it may be said that no inconveniences, not even the slight ones, have been observed. The anaesthesia is equal to that of cocaine and even more rapid; and, finally, the toxicity is about half that of cocaine.—*Gazette des Hôpitaux*, 1897, Nos. 19, p. 183; 20, p. 191.

M. A. LEGRAND makes use of a 1 per cent. solution, and notes in employing Schleich's method that each point of insertion is marked by a rose-colored zone, so that the line for the intended incision is well marked. With solutions of the same percentage the anaesthesia is not so profound and its duration less than with cocaine. During the operation the pulse is slower, but this retardation generally disappears within seven hours after operation. Operations for excision of veins, adenitis, hernia, varicocele, were successfully carried out under its influence.—*Les Nouveaux Remèdes*, 1897, No. 6, p. 161.

DR. G. VINCI replies to the strictures of M. Pouchet (see this JOURNAL, 1897, No. 4, p. 592) and states that his observations, confirmed by Charteris, show that eucaine is less toxic than cocaine. The general symptoms of poisoning are, in the main points, identical; but with equal doses they are less marked with the former. Nor in a large experience have the prodromal symptoms been wanting. The influence upon the heart is not greater; both substances slow the rate and slightly elevate blood-pressure, but only pois-

onous doses diminish pressure, as well with eucaine as with cocaine. The former gives as intense an anæsthesia, but of shorter duration than that of the latter.—*Bulletin Général de Thérapeutique*, 1897, 6e liv. p. 170.

Ichthyol in Pulmonary Tuberculosis.—DR. HEINRICH FRAEDEL reviews the literature, noting that externally the drug narrows the capillaries and reduces the cardinal symptoms of inflammation. From his observations upon thirty patients he reports that the cough was lessened, the expectoration diminished both in consistency and amount, and expelled with greater ease, the night-sweating ceased, the general condition improved. The preparation employed is equal parts of ichthyol (pure ammonium sulpho-ichthyolate) and distilled water, of which twenty to forty drops are given four times daily. To correct the taste a few drops of oil of peppermint are added to the dose, which is taken in a full glass of water before meals. The odor and taste may cause nausea and vomiting in sensitive individuals, but without producing irritation of the stomach, so that in this case it should be given in gelatine capsules.—*Therapeutische Wochenschrift*, 1897, No. 15, S. 357.

The Use of Thymus Gland in Chlorosis.—DR. RAOUL BLONDEL presents a new theory of this disease as follows: chlorosis is an intoxication by the diverse products of faulty assimilation in the economy during the period of growth, which destroy the antitoxic action of the internal secretion of the thymus in infancy and later of the ovary. If the succession of these two antitoxic actions does not take place normally; if the thymus disappears too soon or altogether; if the ovary develops its internal secretion too late or furnishes it irregularly, there is produced a physiological interregnum during which the poisoning by these products of faulty assimilation produce themselves without hindrance. Three instances of the application of this theory are presented; all were young girls who ceased to menstruate early and showed the clinical symptoms of the disease. The raw thymus gland of the calf to the amount of five drachms was given each day for a month. Later the gland was given minced, then in soup. Beyond disgust for the remedy there was nothing unpleasant following its use. The urine contained an increase of phosphates. The results were excellent.—*Bulletin Général de Thérapeutique*, 1897, 8e liv. p. 233.

The Action of Taka-diastase in Various Gastric Disorders.—DR. JULIUS FRIEDENWALD has made a very careful clinical study, making use of modern chemical tests, and concludes that: (1) This remedy exerts no influence under normal conditions upon gastric digestion nor upon cases of nervous dyspepsia with normal motor and secretory functions. (2) In cases of motor disturbances of the stomach, with normal secretory functions, such as atony, it increases the motor action without in any way influencing the secretory function or the digestion of starches. (3) In cases of subacidity it acts differently, according to whether there is a catarrh or a nervous dyspepsia. In nervous cases it has no effect whatever upon digestion, while in cases of catarrh it appears to have a tendency to increase the flow of acid and promote the digestion of starches. (4) It exerts its most favorable influence in cases of superacidity, not only promoting the digestion of starches, but dimin-

ishing the excess of acid and increasing the motor functions. (5) It in a great measure replaces the saliva when this secretion is diminished or absent. It then not only digests the starches in the stomach, but serves the other functions of the saliva in stimulating the gastric secretion, and therefore promoting the proteid digestion.—*New York Medical Journal*, 1897, No. 965, p. 731.

The Use of Scopolamin among the Insane.—DR. S. TOMASINI has employed the hydrobromate and sulphate with equal results. They are injected subcutaneously in dose of from one two-hundred and fiftieth to one-sixty-fourth of a grain. Sleep was readily induced, especially in women, in from two to three minutes. The injections are not painful, nor do they give rise to local reaction nor to general excitation. The pulse is regular, but more frequent. There is marked dilatation of the pupils. The sleep is quiet, resembling the physiological. There are no disturbances nor unpleasant symptoms, as nausea. In maniacal cases and periodical insanity it is a remarkable sedative. Habituation is easily obtained, and the dose must be rapidly increased.—*Riforma Medica*, 1897, No. 12, p. 135.

Treatment of Acute Rheumatism in Children.—DR. W. B. CHEADLE believes that full doses of sodium salicylate are not required; these may be harmful from their depressant affects. If the joint-trouble and pyrexia are marked, the salicylate may be given in appropriate doses at short intervals until they subside. The milder drug, salicin, may be substituted in most cases, given in doses of 5 to 20 grains, or quinine in doses of 1 to 3 grains every four hours. In each case an alkali, sodium or potassium citrate, should be combined and given in doses of 5 to 20 grains, according to age. The use of depressant drugs, as antipyrin, antifebrin, aconite, with a view of lowering temperature, cannot be too strongly deprecated.—*Treatment*, 1897, No. 5, p. 97.

The Chemistry of Gout.—DR. ARTHUR P. LUFF presents the following conclusions of interest to the therapist: (1) The solubility of uric acid in the blood is not affected by a diminished alkalinity of the blood produced by the addition of organic acids. (2) The deposition of sodium biurate is not accelerated by a diminution of the alkalinity of the blood. (3) An increased alkalinity of the blood does not increase the solubility of deposit of sodium biurate. (4) The saline constituents of vegetables exercise a remarkable inhibitory power over the decomposition of sodium quadriurate. (5) The solubility of sodium biurate in the blood is increased by the presence of the saline constituents of vegetables. (6) The solubility of sodium biurate in the blood is diminished by the presence of the saline constituents of meat. (7) The gout-inducing properties of certain wines are not due to their acidity. Probably they owe their gout-inducing action to the effect they exercise on the metabolism of the liver.—*British Medical Journal*, 1897, No. 1893, p. 904.

Treatment of Malarial Hæmaturia.—DR. J. W. MEEK does not believe in the use of quinine in this condition. His treatment is as follows: (1) Sodium hyposulphite in drachm doses every two hours until the patient is thoroughly

purged; then continue in smaller doses until the system is saturated with it. This is a stimulant to the hepatic secretion, causing in large doses an abundant biliary secretion, and is also a valuable intestinal antiseptic. He believes that free sulphurous acid is disengaged in the blood, and that this agent is an antizymotic to such an extent that it destroys the micro-organism which is the real cause of the disease, and thus arrests the process of corpuscular disintegration. (2) Morphine and atropine hypodermatically, sufficient to quiet stomach; also blister the epigastrium if necessary. (3) An abundance of water to wash out the coagula that must necessarily accumulate in the urinary tubules after a hemorrhage. Hot water or hot lemonade is frequently better borne by the stomach than cold. Cupping over the loins is also to be recommended. (4) A mild diet; fresh buttermilk is usually well borne, and this is also a mild diuretic. (5) The patient should remain in a strictly recumbent position.—*Therapeutic Gazette*, 1897, No. 5, p. 294.

The Wet Pack in the Insomnia of Neurasthenics.—DR. G. RICHARD makes use of strips of flannel, six or eight inches wide, and five yards long, which are rolled and wet in water at 95° F. for four minutes. These bandages are now wrung out and applied to the patient. A double spica is made over the chest, neck, and shoulders, continued as a simple envelope over the chest and abdomen and terminated as a double spica of the thighs. The patient is dressed in a flannel shirt, not only to preserve warmth, but as well to absorb excess of moisture. The bed is protected by rubber sheeting. The wet pack is retained for two, three, or four hours for from two to four days until the patient sleeps satisfactorily and free from nightmares. The inconveniences of this treatment are: (1) that it cannot be readily applied by the patient, and (2) that the bandages shall be too tightly or loosely applied. Patients should be particularly enjoined not to sleep during the day nor after meals, to arise early, and particularly to leave the bed on awakening.—*Revue de Thérapeutique*, 1897, No. 6, p. 182.

Treatment of Infectious Diseases.—DR. ALBERT ROBIN calls attention to the influence of cold baths. While these diminish the heat produced by physiological reactions of infection, they also favor oxidation. Through the energetic nervous reaction which they bring about there is an increase of combustion and as well an augmentation of the products of hydration and decomposition, which are slightly soluble, but when oxidized are easily eliminated. Further, these determine an abundant diuresis which relieves the circulation. Baths, or at least cool sponging, are important measures in the treatment of infectious diseases, as typhoid fever, malaria, infectious pneumonia, scarlet fever, or measles. Under their use the amount of oxygen absorbed increases, carbon dioxide elimination is greater in amount, and the temperature falls. The urea increases about 20 per cent. after the bath. Inhalations of oxygen or the dissemination of this gas near the mouth of the patient have also proved to be serviceable.—*Bulletin Générale de Thérapeutique*, 1897, 4e liv. p. 162.

Lavage in Chronic Gastritis.—DR. LOUIS BEHRENS believes that the advantages derived from lavage are: mucus and mucous *plâques* are worked

out, and cells are stimulated to secrete a juice which is acid with no alkalinity to neutralize it. By the direct application of warmth we insure in time muscular reaction, consequently relief of atonic or sluggish conditions of the stomach, raising the function of this organ to the capabilities required of it. Of the solutions, sodium bicarbonate (2 per cent.) is preferably used to facilitate removal of mucus, and when acids other than normal exist, causes neutralization to a degree. The last washing should be with clear warm water at 110° to 112° F., after which the medication indicated to continue stimulation—strychnine or bitter tonics—may be administered.—*N. Y. Medical and Surgical Journal*, 1897, No. 4, p. 208.

The Diuretic Treatment of Renal Dropsy.—DR. NESTOR TIRARD reminds his readers of Manquat's classification of diuretics: (1) Mechanical (a) cardiovascular, and (b) aqueous diuretics. (2) Renal, (a) functional epithelial and (b) irritant epithelial diuretics. Digitalis stands as a cardiovascular diuretic because it increases blood-pressure generally, and also the speed of the flow of blood through the glomeruli, and should be grouped with convallaria, squill, ergot, strophanthus, and caffeine. Of the aqueous we may use the acid potassium tartrate, as the imperial drink, or milk, both of which increase the volume of the blood and directly raise arterial tension. The indications for diuretics, following Huchard, are: (1) to maintain the action of the kidney; (2) to evacuate fluid effusions; (3) to soothe and diminish irritation of the genito-urinary organs; (4) to modify the urinary excretion, to prevent urinary calculi; (5) to exert a derivative action through the renal passages; (6) to hasten elimination of toxic substances from the organism; and (7) to free the blood of morbid matters which are capable of elimination by the kidneys. In the single instance reported great relief was obtained from the use of theobromine sodiosalicylate (diuretin), first from the asthmatic symptoms, and secondly in the amount of dropsy. It is not believed that in this instance there is any permanent result, but sooner or later the pleural cavities must be aspirated and the anasarca of the lower extremities be relieved by acupuncture or by Southey's capillary tubes. These measures, however, should be postponed as late as is possible, for the strength frequently fails rapidly after drawing large quantities of fluid from the extremities, and there is some risk of exciting inflammatory changes in the neighborhood of the punctures. Twenty grains of the drug were given twice daily.—*British Medical Journal*, 1897, No. 1890, p. 765.

Severe Exanthem resulting from Salipyrin.—DR. FEDOR SCHMEY details the history of a fifty-four-year-old man who had been treated in years preceding for nephritis. Sixty grains of the powder were given in four doses. On the next day an eruption appeared upon his scrotum, which became a large, markedly cedematous, infiltrated red surface. The following day the patient, against advice, repeated the drug. Necrosis of the affected areas followed, and a deep wound-cavity was left which healed under sublimate solutions. The urine showed a notable amount of albumin.—*Thüringisch-Heimische Monatshefte*, 1897, Heft 3, S. 175.

MEDICINE.

UNDER THE CHARGE OF

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Digestive Disturbances from Hernia, especially those in the Linea Alba—KUTTNER (*Mitteilungen aus der Grenzgebieten der medizin und Chirurgie*, vol. i. No. 5) suggests that, in the absence of abnormalities on the part of the stomach itself, we have been too ready to diagnosticate neuroses. More attention should be paid to the condition of the other organs. Hernia is particularly important, and Kuttner in this connection calls especial attention to hernia in the linea alba. These are often very small, varying in size from a pea to a walnut, usually above the navel, may be multiple, occur generally in men from twenty to fifty years. All the author's twelve cases were among the working-classes. They are most apt to contain only sub-peritoneal fat, but may consist of omentum or intestine. The symptoms are the same in any case. These are very various. There may be no disturbance at all, or the symptoms may come on suddenly and be most severe. In the typical case there is colicky pain, increased by pressure, radiating toward the shoulder or giving the girdle-sensation; there are generally recurring attacks of pain and vomiting. A diagnosis must be made from gastric ulcer, gastrectasis, gastralgia, gallstone, renal colic, etc. This is aided by the presence of the tumor, the great local tenderness, and sometimes, if the hernia contains gut, by Litten's symptom, a sensation as if peas were thrown or water spurted against the palpating fingers when the patient coughs. The author has very little confidence in palliative treatment, and thinks that all hernias in the linea alba causing symptoms should be operated upon. The results of such operations have been, upon the whole, quite satisfactory.

Non-carcinomatous Stomach-tumors.—H. SCHLESINGER (*Zeitschrift für klinische Medizin*, vol. xxxii., supplement) says, although the stomach has lately been much studied, the most attention has been paid to cancer, and other tumors have received but little notice. Sarcomata of the stomach may be primary or secondary, and, as in the case of cancer, the former are commoner. Primary sarcoma may develop from any part of the organ, most commonly from the greater curvature. Lymphosarcoma differs from the others in that it occurs more often secondarily. The following kinds have been observed: spindle-celled, myo-, angio-, fibro-, and lympho-sarcoma. Clinically, sarcoma of the stomach occurs as a rule late in life; the primary lymphosarcoma is apt to occur earlier than the other forms. Of thirty cases of all kinds nineteen were in females.

Loss of weight is often the first symptom ; often there are no stomach-symptoms in the beginning. As the disease progresses the stomach-disturbance becomes marked, and there may be coffee-ground vomit. If a tumor is present, it behaves like that of cancer. There may be pyloric stenosis, with dilatation, tetany, etc. Facts relating to the chemistry are meagre. In seven cases HCl was absent in all, and lactic acid was found in five. In three of Schlesinger's own blood was present in the washing. Albumin has often been reported in the urine, but so far no pepton. In all the author's cases and in many others leucocytosis was shown, with a relative diminution of the hemoglobin. A digestion-leucocytosis has not been shown. The course of the disease is, as a rule, from one to one and one-half years. The metastases offer the most valuable guide in the differential diagnosis from cancer. Primary sarcoma of stomach may form secondaries in the skin. Those in the intestine, differing from those of cancer, do not form strictures. There is very frequently spleen-tumor. Death seems to occur more frequently from perforation than in cancer. In a few cases temporary benefit has been obtained from the use of arsenic. The author describes two cases of sarcoma of the stomach, and notes seventeen cases from the autopsy-chamber, together with sixteen that were studied clinically as well.

The Course of Croupous Pneumonia.—V. WEISMAYR (*Zeitschrift für klinische Medizin*, vol. xxxii., supplement), after a review of the literature, reports the course of the disease in 39 selected cases of pneumonia. The Fraenkel diplococcus was found in the sputum of 34; of these, 3 ended fatally. In 24 of the 31 cases recovering the disease began with a pronounced chill. In 26 there was crisis from the fourth to ninth day; in 4 there was lysis from the third to eleventh day; one ran an afebrile course. In all resolution took place promptly. In two cases of mixed Fraenkel and streptococcus infection the disease began like ordinary pneumonia. One died on the nineteenth day, and the second was free from fever on the thirty-seventh. In the first resolution began the day before death; in the second on the twenty-fifth, and was not complete till the fortieth day. In both the fever was irregular, and in both the inferior lobes were involved.

Three cases of pure streptococcus pneumonia recovered; two began with a chill. In one long-continued fever, in the other two fever was absent after the eighth day. In all the duration of the physical signs was striking. Once the dulness was first found on the ninth, to continue till the twenty-second day. In the second the resolution was not complete till the twenty-fifth day, and in the third the physical signs were present till the nineteenth day. The author does not agree with Finkler, who holds that streptococci cause only lobular pneumonia; he admits, however, that his cases may have been originally diplococcus infections. V. Weismayr, however, insists that a bacteriological examination of the sputum is very important in pneumonia, and that if streptococci are found a delayed resolution is to be expected.

Aortic Insufficiency without Murmur and Pseudo-insufficiency.—V. WEISMAYR (*Zeitschrift für klinische Medizin*, vol. xxxii., supplement) says aortic insufficiency has a very characteristic symptom-complex; still errors in diagnosis may arise, because we may have: 1. Accidental diastolic murmurs

in the aortic area. 2. Incompetence without murmur. 3. Typical symptoms on the part of the peripheral vessels, without regurgitation—pseudo-insufficiency. The first of these conditions is very rare. Aortic regurgitation, mitral stenosis, pericarditis, and aneurism must be excluded. The occurrence of a lesion without a murmur is more common. It has been proposed in explanation that complicating lesions, aortic or mitral stenosis, may prevent a large amount of blood from entering the aorta, and by lessening the regurgitation lessen or do away with the murmur. Lessening of the pressure in the arteries may bring about the same result. These facts do not explain the absence of a murmur in cases where there is high pressure in the vessels. Under such circumstances the author thinks the shape of the opening may be important, as it may direct the return-flow in such a way that it meets the flow from the auricle at an angle so obtuse that the eddy, and with it the murmur, is diminished.

The author cites two cases of pseudo-aortic insufficiency, with autopsy, in which the symptoms on the part of the peripheral vessels were the typical ones of aortic regurgitation. The aortic semilunar valves were found to be intact. V. Weismayr would explain the symptoms in his two cases by the hypertrophy and dilatation of the heart and by the atheroma of the aorta, rendering it incapable of dilating and causing the peripheral arteries to throb more violently. He holds that the prompt sinking of the pulse-wave is explained by the elasticity of the vessels. A differential diagnosis between pseudo-aortic regurgitation and a regurgitation without a murmur is scarcely possible. The presence of the dicrotic crest does not exclude true regurgitation. If atheroma is present and the valves are otherwise intact, the condition is most likely pseudo-insufficiency; if another lesion co-exists, a true regurgitation without a murmur is more probable.

Infectious Diseases after Removal of the Spleen.—BLUMREICH and JACOBY (*Berliner klinische Wochenschrift*, 1897, No. 21). The enlargement of the spleen in infectious diseases gave the authors the idea of removing this organ, and then infecting guinea-pigs with various bacteria or their toxins. The authors experimented with diphtheria, anthrax, pyocyaneus, and cholera. In the case of anthrax the results were doubtful. With all the others, however, it was seen that if injected with the toxin, both the animals with and without their spleens reacted in the same way. However, when the bacteria themselves were used the splenectomized animals lived longer or died less often than the normal ones. The same result was obtained if the splenic vessels were tied. The defibrinated blood of animals before and after splenectomy was mixed with virulent cultures of bacillus pyocyaneus; in the latter case it could be shown to have more marked bactericidal, but no more antitoxic, properties than in the former. The leucocytes were counted in sixteen animals before and several times after the removal of the spleen; fourteen times a marked leucocytosis was found. The increase in white blood-cells does not come from the irritation of the wound. The authors think they are justified in saying "following the excision of the spleen there occurs an hyperleucocytosis. In connection with this there is an increase in the bactericidal power of the blood and in the protection of the organism against infectious disease."

Acromegaly.—HANSELMANN (*Berliner klinische Wochenschrift*, 1897, No. 20) reports a case that came to autopsy with a diagnosis of diabetes and furunculosis. The post-mortem examination showed characteristic changes in the hands and face. Occupying the position of the hypophysis there was a tumor 3 x 2.5 x 2 cms., a sarcomatous struma of the hypophysis. The thyroid was slightly enlarged, with larger and smaller colloid cysts. No thymus present. The pancreas was 20 x 4.5 x 1.5 cms., weighing 47 grammes, not strikingly atrophic, but microscopically there was a marked increase of the connective tissue. This case is interesting on account of the combination of the tumor, the struma, and the diabetes. The author found ninety-seven reported cases of acromegaly. Autopsy was performed in fifteen, and of them twelve showed changes in the hypophysis cerebri. The other three were either not typical or were not carefully examined. We may infer that there is a connection between the changes in the pituitary body and acromegalia. The author's own view is that all organs have a double function: a negative, withdrawing something from the organism, and a positive, introducing something into the organism. Again, that the progressive development of one organ has progressive development of other organs as a consequence. This latter process he calls, in distinction to compensatory hyperplasia, altruistic hyperplasia. The pancreas offers an example of the first part of the theory. It eliminates the pancreatic juice, and by its positive activity prevents diabetes. The sexual organs, in the connection of their development with that of other organs as the larynx, offer a good illustration of altruistic hyperplasia. If a causal relation exists between tumors of the hypophysis and acromegaly, the author thinks it can best be explained as an altruistic hyperplasia. Hanselmann decries the indiscriminate use of organ-extracts. Theoretically, they should be of use in cases of altruistic atrophy, as myxœdema, and possibly in some cases of diabetes and Addison's disease. He thinks organ-therapy is out of place in Graves's disease and in acromegaly. The author thinks there was no connection between the struma and the acromegaly. On the other hand, partly because of the fact that there is often an increase of the connective tissue in both diseases, he thinks it not unlikely that there was a close connection between the diabetes and the acromegaly.

Neusser's Granules and the Excretion of the Alloxur-bodies in the Urine—In 1891 NEUSSER described a special granulation of the leucocytes in cases of so-called uratic diathesis. Under the term uratic diathesis he included a variety of conditions like gout, uratic lithiasis, and various types of so-called "irregular gout," including muscular rheumatism, nervous asthma, certain skin affections, and gastro-intestinal disturbances, leukæmia, neuralgia, and neurasthenia. For demonstrating the granules he treated the dried blood-slide with a modification of Ehrlich's tri-acid mixture by means of which the granules were stained of an intense greenish-black color. The individual granules varied considerably in size and were situated always over and around the nuclei of the leucocytes, but never in the protoplasm of the corpuscle at a distance from the nucleus. They were most abundant in the mononuclear leucocytes, but were present also in smaller numbers in the polymorphonuclear and eosinophilic leucocytes. Neusser

expressed the view that these granules were the result of an over-production on the part of the cell-nuclei, and thought them to be related in composition to the nucleo-albumins. He considered the presence of these granules in the leucocytes as an indication of increased uric-acid production in the organism. He stated also that in certain cases of pulmonary tuberculosis the granules were markedly increased in number. Such cases, he supposed, ran a more favorable course than others, and the finding of an abundance of granules he asserted sufficed for the making of a favorable prognosis at the bedside.

A new theory to explain the causation of the uric-acid diathesis has been advanced by Kolisch, an assistant of Neusser's. He holds that the diathesis does not depend upon the formation of uric acid or upon its relative solubility, but rather upon an increased production of the so-called alloxur-bodies (including uric acid and the xanthin bases), which are derivatives from the products of broken-down nuclein. According to Kolisch, in cases of uratic diathesis the xanthin bases, which normally constitute only a very small percentage of the alloxur-bodies, are markedly increased at the expense of the uric acid, and he believes that the disease and the symptoms which accompany it are directly dependent upon the toxic effects of these xanthin bases circulating in the blood. It is to be noted, however, that while it is Kolisch's view that the xanthin bases are increased at the expense of the uric acid, he finds also that there is an absolute increase in the total amount of alloxur-bodies, so that this exceeds the limit supposed to be normal. It is of especial interest that he asserts to have made out the regular coincidence between an abundance of Neuser's granules in the leucocytes and an increase in the alloxur-bodies eliminated in the urine. Kolisch went further, and concluded that the former stood to the latter in the relation of cause and effect.

FUTCHER (*Centralbl. f. innere Med.*, 1896, No. 39), of the Johns Hopkins Hospital, has recently undertaken a research bearing upon this topic, and has embodied his results in an interesting paper. With the object in view of ascertaining whether or not the theory of Kolisch has any foundation, Fletcher studied the blood from a large number of cases with especial reference to the presence of these granules in different metabolic conditions. Among his cases were four of true gout in which characteristic tophi and joint-affections existed. In two of these cases the granules were abundant, though not especially marked in the mononuclear leucocytes. In the other two cases the granules were present in only moderate numbers, and were not more numerous in the mononuclear than in the polymorphonuclear cells. He found further in cases of tuberculosis that in some instances the granules were abundant, in others very few in numbers, but he could make out no relation at all between the number of granules and the course of the disease. According to Fletcher, many healthy individuals show the granules in just as great numbers as persons suffering from disease.

The clinical importance of Neusser's granules would seem to be further diminished by the fact that the blood shows definite daily variations as regards its richness in these granules.

In eight cases the relation of the granules to metabolism was exactly studied by Fletcher by accurate chemical methods in Kraus's laboratory in

Graz. Each of these patients was placed upon a diet affording the proper number of *calorien* daily, according to his body-weight, and was kept upon this diet for the full period of the experiment, which lasted usually for from five to six days. It was thus possible to make the amount of nitrogen eliminated about constant from day to day; the total nitrogen ingested, as well as the total nitrogen given off in the urine and feces, were estimated by Kjeldahl's method. In addition, the alloxur-bodies were estimated by the Krüger-Wulf method, and in two instances the uric acid was also estimated, the method of Ludwig being employed for this purpose.

Kolisch had stated the normal amount of alloxur-body-nitrogen for twenty-four hours to be 0.260 gramme. A comparison of the few estimations that have been made by other investigators would make this value appear to be rather too low. When the alloxur-body-nitrogen reaches 0.4 gramme, or a little more than this, it may, according to Futeher, be considered as physiologically high, while amounts reaching 0.5 gramme or more may be said to be pathological. Futeher's study of his eight cases seems to prove conclusively that there is no definite connection between Neusser's granules and the elimination of the alloxur-bodies in the urine. He found instances in which the granules were numerous, even extremely numerous, while the quantity of alloxur-bodies in the urine was relatively low. In other instances, where the amount of alloxur-bodies was high the granules could be present in very small numbers. He further observed in two patients suffering from the same disease (hypertrophic cirrhosis of the liver) daily variations in the richness of the granules which were quite apparent, and which were not associated with any corresponding rise or fall in the quantity of alloxur-bodies excreted. On the contrary, an increase in the granules could even be associated with a diminution in the alloxur-bodies and *vice versa*. A direct relation between the presence of Neusser's granules in the blood and an increased elimination of the alloxur-bodies, in the urine must therefore, Futeher thinks as a result of his experiments, be denied.

Herpes Zoster and Facial Paralysis—EICHENHORST (*Centralbl. f. innere Med.*, 1897, No. 18). This combination of symptoms is very rare. Ebstein, in 1895, was able to collate but eleven cases. The author has found seven others, and adds the following of his own: a woman, aged twenty years, no nervous disease in family, three children. Trouble began the day after sitting in a draught, with a drawing sensation in right side of face, slight tenderness over right eyebrow, followed by pain radiating from neck to back of head and on right side. On the third day a total right-sided facial paralysis. Four days later a vesicular eruption on the lower half of the right ear and in the auditory canal, on the right half of the tongue, uvula, and palate. The paralysis was very marked, with complete reaction of degeneration. The tongue protruded straight; touch and taste unimpaired. Sensation of face intact. No tenderness at points of exit of the fifth and seventh nerves. No cerebral symptoms. So far as the author knows, this is the fourth case in which the paralysis preceded the herpes. In all such cases, too, the herpes has been limited to the trigeminal distribution. The occurrence of such herpes on the mucous membrane has been described by Remak alone. It is well known that in facial paralysis of peripheral origin there occurs a gus-

tatory paralysis of the anterior two-thirds of one-half of the tongue. From the case above, where this does not occur, we must conclude that the chorda tympani carries both taste and trophic fibres. Eichhorst thinks the phenomena in his case may be explained as follows: the trigeminal branches were involved; the tongue herpes was caused by continuation of the inflammation from the facial to the chorda tympani and affecting only its trophic fibres.

SURGERY.

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Cysts and Cystic Tumors of the Breasts.—SASSE (*Arch. für klin. Chir.*, 1897, Band liv. Heft 1), after a careful pathological and clinical study of a series of cases, which are reported in detail, arrives at the following classification of the cystic tumors of the breasts, which he divides into two principal groups:

1. Those produced by a chronic interstitial inflammation and resulting in a widening of the excretory ducts into cysts—*nastitis chronica cystica*, König.
2. Multiple cysts of the breasts resulting from a pure epithelial hypertrophy and cystic dilatation of the acini—*polycystoma mammae*—which frequently are bilateral and are described by Reclus as *maladie kystique*, and by Schimmelbusch as *cystadenoma*. They have the same origin as the small cysts which are found in the sound portion of a breast hardened by carcinomatous disease in profuse numbers, and are found on the undersurface of the gland. The relationship between carcinoma and cyst-formation is shown by the ease with which the *polycystoma*—that is, the *cystadenoma diffusum*—can change into the carcinoma; so may, on the other hand, carcinoma of the breast cause, by the resulting irritation of its growth, the above cysts.

Among the cystic tumors there are many forms, which may be readily distinguished one from another and readily illustrated by groups of cases. From the cystic connective-tissue tumors, the *cystosarcoma* and *fibro-adenoma*, we have traced the relation to the epithelial tumors, and have first described the formation of the *intracanicular cystic adenoma*—how they originate in the walls of the excretory ducts as *adenomatous hypertrophies*, which fill up the lumen of the duct and then cause its dilatation and the

formation of cysts finally developing into enormous tumors. The circumscript cystic adenoma (tubular of Billroth) was shown to be a nonencapsulated but well-defined tumor, which makes its appearance in the glandular structure of young individuals, especially in the terminal branches of the glands, the smallest canaliculi and acini, while the excretory canals are but slightly affected.

All of these tumors are benign in their nature; the newly formed gland-tissue conforms, though in an irregular manner, to the physiological type, and the epithelium never infiltrates into the surrounding tissues. It is otherwise in the last group, the cystic adenoma proliferum and the cystocarcinoma. Both arise from the acini by cystic dilatation, and depend entirely upon a profuse proliferation of the epithelium.

In the cystic adenoma proliferum the connective tissue is not so widely involved—only so much as goes to form the foundation and stroma of the bloodvessels, which are a part of the papillae and gland-tissues. But also here the epithelium enters into the lymph-spaces, infiltrating and infecting just as in carcinoma, and the development of the one into the other is not rare. The cystocarcinoma is indistinguishable from the soft carcinoma except in its location; it exemplifies the last stage of cystic degeneration of the mammae.

The Treatment of Insect-bites.—OTTINGER (*Munch. med. Woch.*, 1896, No. 49) recommends highly the use of ichthyol as an application to insect-bites, either painted on with a brush or in the form of an ointment or as an adhesive plaster containing 10 per cent. of the drug. In a few moments the pain, burning, itching, etc., cease and the swelling goes down rapidly.

Bacteriology of Appendicitis.—From the examination of the exudate at the time of operation in twenty cases of appendicitis, ACHARD and BROCA (*Gaz. Heb. de Méd. et de Chir.*, April 1, 1897) found that the bacterium most frequently met with is the coli bacillus, and it is not to be doubted that this bacterium may exist in the exudate alone. In the cases examined, all purulent, ten cases were associated with other bacteria; most prominent among these were six cases in which the streptococcus was found.

This prominence of the streptococcus leads to the belief that it plays an important part in peri-appendicular peritonitis. It is probable that the coli bacillus acts only secondarily, but owing to its greater vitality is reproduced more rapidly, and is in consequence more numerous.

The pneumococcus was found in one case, while in three cases in which perforation occurred there were no coli bacilli present.

It is probable that in appendicitis, as in other cases of suppuration, the coli bacillus is aided by other bacteria, while it does not wait long before it outnumbers and destroys them.

The Disinfection of the Hands.—This subject, which is of such great importance in clinical surgery, has been carefully studied by WIER (*Medical Record*, April 3, 1897), whose studies lead him to the following conclusions:

1. That the solutions of corrosive sublimate are unreliable.
2. That such disinfection is far best applied, and in the order named, by the use of nascent chlorine, alcohol, or potassium permanganate.

3. That chlorine is satisfactorily evolved by the conjoined use of moistened chemical chlorinated lime and crystallized sodium carbonate.

4. That of these three procedures the chlorine treatment is least hurtful to the hands; alcohol the most trying.

The author has devised a simple, easy, and inexpensive yet efficient method of obtaining the sterilization by nascent chlorine.

After the usual scrubbing with soap and water, and the use of green soap, and cleaning the periungual spaces, one or more large crystals of carbonate of sodium (washing soda) are taken in one hand and covered with about a tablespoonful of bleaching powder (chlorinated lime), and enough water is added to make a thin paste, which at first feels warm, and from which fresh chlorine gas comes. This is rubbed for two or three minutes over the hands, nails, and forearms until a creamy paste is formed or until the sodic crystals impart a cool sensation or until the rough grains of bleaching-powder have mostly disappeared, when the hands are washed in sterile water.

Intravenous Injections of Mercury in Syphilis.—BYLES (*British Medical Journal*, April 3, 1897) gives the following technique for the treatment of syphilis by this method:

That each separate injection be successful is of primary importance, due to the fact that it has to be repeatedly performed, while the only veins available are those of the upper arm and forearm. The apparatus required is a hypodermatic syringe with a glass piston, two platino-iridium needles, the solution to be used, and a piece of rubber tubing for a tourniquet.

The patient's arm is bared to the shoulder, and he holds the tourniquet. A prominent vein is chosen—not near the elbow, on account of motion; preferably the cephalic or one of the prominent veins of the forearm. The syringe is now filled with the solution employed, the needle affixed and sterilized in the flame of a spirit-lamp. All air-bubbles should be clear of the syringe. The syringe should be of glass, with asbestos-packing, and hold twenty to forty minims. This syringe may be sterilized by boiling.

To insert the needle into the vein chosen hold the syringe almost horizontally and in the direction of the blood-stream. It is an important point that if the needle has failed to enter the vein, movement of the needle, especially depression, will give rise to dimpling of the skin; whereas if the needle is in the vein, not only is the movement free, but in many cases blood will pass into the syringe and color the solution.

The patient is now told to release the tourniquet gently. After this has been done the least possible quantity of injection is thrown into the vein; if the patient feels nothing, the vein has been successfully entered and the injection may be completed; if, however, the patient complains immediately of smarting pain, withdraw the needle, as the vein has been missed and the solution is passing into the subcutaneous tissue.

By careful attention to these details the painful bruising arising from a misplaced injection is rendered a matter of impossibility. In a few cases some staining may appear at the site of the injection a day or two after, from a few drops of blood from the vein having escaped into the surrounding tissue. If there has been a greater escape of blood, there may occur a peri-

phlebitis; the chances are greater if the injection has been made near the elbow. The puncture should be sealed with collodion and cotton.

The amount of injection varies with different patients, but can be regulated by the effect upon the gums. In most cases twenty to forty minims every other day will be found sufficient. The solution employed by the author has been the liq. hydrarg. perchlor. B. P. and the 1 per cent. solution of the cyanide; they are of equal value.

But in tertiary cases and in syphilitic cases of tuberculous form, in cases of rupia and bad throat, etc., where iodides are indicated, he considers that better results are obtained by twenty to forty minims of sodium iodide, $\mathfrak{5j}$, in liq. hydrarg. perchlor., $\mathfrak{5ss}$.

In some rare cases, where over twenty minims every other day have tended to cause salivation, he has found great advantage in following up the mercury injection by one of a dilute solution of sulphate of atropine, such as twenty minims of a solution containing $\mathfrak{5j}$ of the liq. atropine sulph. B. P. in $\mathfrak{5vij}$ of distilled water, the syringe being filled with this without removing the needle after the injection of the mercury.

The advantages of the method the author considers to be very great; its action is as rapid and thorough as that by mercurial inunction, while the inconvenience to the patient is much less, and in consequence the regularity of the treatment is more certain, while the dosage is completely under the control of the surgeon, as it is not dependent upon the varying absorptive power of the skin.

The Treatment of Strictures of the Rectum.—BERGER (*Gaz. Hebdom. de Méd. et de Chir.*, October 22, 1896), in speaking of this subject before the Surgical Society of Paris, considers dilatation as the best method of treating these strictures, especially those due to syphilis.

The treatment should be carried out carefully and gently. The *séances* should be twenty-four to forty-eight hours apart, and it should never be considered necessary to pass the next larger size at each successive sitting at all hazards.

The bougie should be introduced in the axis of the diseased rectum, always remembering that this differs materially from that of the healthy rectum. In passing a new bougie it should enter gently until a resistance is felt; then it should remain for a moment until the stricture relaxes and, as it were, descends of itself upon the bougie. There is apparently a spasmodic element in all syphilitic strictures of the rectum, which readily explains the difference noted from day to day in the case with which the bougies are introduced.

The dilatation acts only upon the stricture, and does not cure the proctitis which has resulted from the stricture. This must, therefore, be treated with warm antiseptic irrigation.

This method of treatment is not applicable to all cases; it is contra-indicated where there is grave infection, with fever, collapse, and peritonitis; any precarious condition of the patient; an abundant suppuration; marked rectal tenesmus, and a stricture situated high up in the rectum.

In these cases Berger prefers a posterior rectotomy rather than the extirpation of the rectum. The rectotomy affords immediate relief, and is a less grave operation than extirpation; while it affords as much relief, neither is

an absolute cure. The extirpation does not cure the proctitis and is followed by relapse; it does not prevent a constrictive incontinence of feces, while after rectotomy the sphincter will act.

Clinical Observation on Floating Kidney in Women.—In addition to a critical study of one hundred cases of floating kidney in women, KNAPP (*Zeitsch. für Heilk.*, Bd. xvii. Heft. 2 u. 3) has studied the cases reported in the literature of this subject with special reference to this disease as observed in women.

As an etiological factor which has not been sufficiently dwelt upon he calls attention to the connection existing between this disease and an antelexion of an enlarged uterus which exceeds normal physiological limits. Out of one hundred cases he found abnormal antelexion in eighty-five.

The prognosis is dependent upon the possibility of restoring the kidney to its normal position and maintaining it there. When this is not possible the symptoms present affect the diagnosis.

As prophylactic measures the author recommends regulation of the bowels and especial care during gestation, to prevent too great antelexion.

In regard to treatment, the author questions the need of treatment in mild cases. Many cases of dislocated kidney continue for years and never have a symptom to make the condition evident. There are, however, symptoms which require treatment. Mechanical support should be directed to the support of the intestines in general. He does not advocate the use of pads, etc., as such appliances do not act certainly. Bandages, if employed, must be suited to the individual case. He recommends massage after the method employed by Thure-Brandt. He does not advocate operative treatment, believing it does not secure relief.

The Sulphate of Sodium as a Hæmostatic.—REVERDIN (*La Méd. mod.*, October 21, 1896), in a paper read before the French Surgical Association, advocates the employment of the sulphate of sodium as a hæmostatic. He has employed it a number of times successfully; it is used in small doses (10 centigrammes—gr. 1½) every hour, in dangerous capillary hemorrhage either of spontaneous or traumatic origin. As an example, after the removal of a subcutaneous benign tumor there followed a hemorrhage which resisted all treatment for eight weeks. The same was true of other cases of traumatic origin, and also in cases of menorrhagia.

This remedy was used by Kussmaul, and is apparently popular in the north of Germany in cases of hæmophilia.

By experimental and clinical observation the author determined that this drug should be given by the mouth only, as it is ineffectual when used in subcutaneous injections.

The Employment of Murphy's Button.—HEYDENREICH (*La Méd. mod.*, October 21, 1896), after reporting four cases in which he has employed the button, reviewed the accidents which have followed its employment.

In the first series the button did not procure the exact coaptation of the surfaces brought into contact, either because the buttons were not properly brought together or because they were too small. These accidents are to be

avoided by using better technique and larger-sized buttons. Or a series of Lembert sutures may be employed to surround the entire area.

In the second series the buttons prevented the passage of the intestinal contents. This is more common in the large intestine, where the contents are solid. It is to be avoided by the use of buttons having a large aperture and the administration of laxatives at a proper time after the operation. He also would not advise its use in connection with the large intestine.

In the third series there was perforation of the intestine either from defective union or by gangrene from later pressure by a button of too large calibre. The defective union in most cases was due to a defective construction of the button. The surfaces should be flat and compress equally, and not cut through on the border of the button. The calibre of the male and female portion of the button should be equal externally, so that they do not overlap each other when in position.

Finally, it is sometimes the case that in a gastro-enterostomy the button is not expelled, but falls into the stomach, where it gives rise to complications.

The author does not believe that these accidents should prevent the use of the button. It has the great advantage of permitting of a rapid operation in patients frequently very feeble and incapable of supporting an operation of longer duration. The efforts of surgeons should be directed toward improving the mechanical construction of the button to make it lighter, less voluminous, and absorbable.

In the discussion following, JOUNESCO said that he had employed the button in a number of instances, and thought that the procedure might be improved by a modification in the technique of its employment.

Instead of passing the button into the stomach or intestine by the usual method, he makes another opening, passes the button through that, and then cuts down upon it where it is pressed outward at the point where he desires it to emerge; thus the opening is not large enough for it to pass through and it is retained in a better position. The first openings are then sutured.

Suture of the Lateral Sinus; Recovery.—SCHWARTZ (*Gaz. Hebdom. de Méd. et de Chir.*, October 22, 1896) reports an interesting case in which, in raising a depressed fracture, caused by the kick of a horse, the dura was found to be adherent to the bone at a point directly over the left lateral sinus; despite all precautions it was torn for about one centimetre. A finger placed over the wound arrested the hemorrhage in a measure while two silk sutures were introduced by a fine Reverdin needle. When the sutures had been tied the blood flowed only by the suture-wounds, and was readily controlled by a small tampon of iodoform-gauze, which was carried out of the wound; the patient recovered. The bone was found to be necrosed at the point where the tear took place, and there was an osteitis which involved the sinus.

The patient remained in the hospital six months, and recovered completely from the mental and motor cerebral symptoms. There remained only some slight defect of memory.

The case shows that suture of the sinuses is possible in spite of their rigid, fibrous character, and should be employed when other means fail. It should be the method of choice in large sinuses, as the lateral sinus and the

posterior portion of the superior longitudinal sinus, where permeability is of great value. In other cases catgut tampons or compression may be employed.

Two Cases of Replacement of the Diaphysis of the Tibia by the Diaphysis of the Fibula.—POIRIET (*La Méd. mod.*, November 4, 1896) reports two very interesting cases in which, after the almost total loss of the diaphysis of the tibia by osteomyelitis, he succeeded in replacing that diaphysis by that of the fibula by grafting it into the epiphysis of the former. The fibula became hypertrophied and replaced functionally the tibia.

Appendicitis.—DUPLAY (*La Sem. Méd.*, October 7, 1896), in speaking of the treatment of different forms of appendicitis, says that in an acute attack one should wait for resolution to take place, and then operate during the period between the attacks. If, on the contrary, suppuration takes place, the abscess should be opened immediately. If the appendix is found, it should be ligated at its base and removed. If, however, it is not found in the cavity, shut off by the adhesions and false membranes from the general peritoneal cavity, it should not be sought for; these adhesions should be respected, and one should be content to drain the abscess-cavity by inserting iodoform-gauze.

Acquired Hydronephrosis.—CABOT, after describing some of the causes of this condition (*Boston Medical and Surgical Journal*, vol. cxxxiv., No. 17, 1896), relates a case illustrating one variety which he succeeded in curing by a new method. The patient was a woman, thirty-two years of age, whose symptoms began ten years before the present observation. Two years before the operation she noticed an enlargement in the right side of the abdomen. Pain was constant and increasing in severity. A fluctuating movable tumor was easily made out. On account of the high degree of mobility it was thought unsafe to aspirate from the loin. An abdominal incision was made in order to fix the kidney in the proper position during this procedure. The needle drew off a quantity of pale, amber fluid, which emptied the sac. The abdominal wound was closed. Recovery followed, and for two weeks there was no sign of recurrence. At the end of this time the tumor was again noticeable. It was decided to expose the kidney by an incision in the loin. After the sac was emptied the ureter could be seen running in a tortuous course. There was no valve. The mechanical condition which had led to the hydronephrosis appeared to be a twisting of the ureter at some point in its tortuous course. In order to efface as far as possible all of the abnormal twists in the ureter a gum-elastic bougie, about No. 6 of the French scale, was introduced with some difficulty through the ureter until it reached the neighborhood of the bladder. The sac was sewed to the edges of the wound, and a drainage-tube introduced into the pelvis of the kidney. The bougie was left *in situ*. The recovery, although slow, was uneventful. The bougie was removed at the end of three and one-half days, and the drainage-tube at the end of nineteen days.

The author calls attention to two interesting points in the success of the case: first, the considerable degree of activity retained by a kidney so long affected by a very great dilatation, which was shown by the quantity and quality of the urine obtained through the loin; secondly, the success which

attended the treatment of the ureter. The restoration of permeability of the canal, which was accomplished by the bougie and assisted by the fixation of the sac in the loin, seems to have endured for a sufficient time since operation (seven months) to lead to the hope that it may prove permanent.

Tulhær is reported as having cured nine cases of intermittent hydronephrosis by fixation of the movable kidney in its normal position. The action of the bougie is explained as removing the various curves of the ureter while the pelvis is contracting and pulling it into shape. In addition, a moderate amount of inflammation is set up in the walls of the ureter which stiffens it and attaches it to the adjacent parts, which tends to retain its natural position.

Fashion in Antiseptics.—DUNN (*Med. Press and Circular*, May 5, 1897) points out the fact that although the antiseptics used at present produce gratifying and satisfactory results, they all have their disadvantages, and none of them are universally applicable. The fashion in antiseptics changes and should change until the surgeon meets with the ideal antiseptic. This the author describes as one which could be used in its various forms for every purpose, effectually, perfectly, and without causing in any way deleterious effects either to the surgeon or the patient.

The results obtained by Röhrer, Kossmann, Bimmermann, Ostermann, and others, in extended trials with the antiseptic chinosol led the author to test its properties, and the result has been very gratifying. The claims for the drug are that it is: (1) non-caustic; (2) non-toxic; (3) very diffusible; (4) a powerful deodorizer; (5) non-hygroscopic; and (6) that it does not coagulate albumin. The author's experience with it justifies these claims. Its great advantage, he thinks, is that it can be used for everything as an antiseptic. It meets the difficulty of strong solutions of carbolic acid, because it does not injure the skin of the hands; in a double sense it is superior to the perchloride, because (1) it does not harm the instruments, and (2) does not coagulate albumin. It is a perfect antiseptic powder and combines with boric acid. It is a powerful antiseptic, destroying virulent germs in 1 to 10,000 solutions.

A New Operation for Extroversion of the Bladder.—HARRISON (*Medical Press and Circular*, April 28, 1897) describes an operation which he employed for the relief of a distressing condition resulting from an extroversion of the bladder in a boy fifteen years of age. The patient's thighs and body were excoriated by the urine, while the surface of the exposed bladder-wall was tender and liable to bleed on the slightest touch.

The first step was the removal of the left kidney by nephrectomy. After a lapse of eleven months, when the patient had fully recovered from this operation, a bougie was inserted into the remaining ureter; it was then found by dissection through the lumbar region at the level of the iliac crest. After ligation it was resected and the proximal end brought out through and stitched to the edge of the wound.

The urine now flowed out at this point, and the exposed mucous surface of the bladder was dressed with an antiseptic sedative ointment. It was noted that during the transplanting of the ureter retching and attempts to vomit

became continuous. The patient also vomited at frequent intervals for twenty-four hours, when the vomiting ceased after the removal of the suture which united the ureter to the wound. The change in the mode of urination was of great benefit to the patient. The urine was of a different character, and did not excoriate as it did after passing over the exposed mucous surface of the bladder. His general condition was also much improved.

OTOLOGY.

UNDER THE CHARGE OF

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Foreign Bodies in the Ear.—PREOBRASHENSKY thus summarizes the teachings of the literature on the subject of foreign bodies in the ear (*Wiener klin. Rundschau*, 1896, Nos. 33-36): 1. An unskilled person should never attempt the instrumental extraction of a foreign body. 2. Foreign bodies reach the middle ear almost exclusively as the result of inexperienced attempts at extraction. 3. The foreign body usually does less harm than endeavors at its extraction by an inexperienced hand. 4. The changes produced by the presence of a foreign body in the ear cannot be estimated by the length of time it has lodged there. 5. The injection of warm water is an infallible means of securing the evacuation of any foreign body from the ear. Irrigation with alcohol will prevent swelling of vegetable matter. [The ear may be syringed with alcohol instead of water, in some cases, in order to prevent swelling of a vegetable substance.—Rep.] 6. There is no indication for hasty removal of foreign bodies which give rise to no troublesome symptoms. 7. The inflammation caused by necrosis from unskilled attempts at extraction may be met by expectant treatment as long as no dangerous symptoms are present. 8. The choice of an operation depends mainly on the condition of the external auditory meatus. As to living objects, insects are easily killed by water or oil, and may then be washed away, the only exception being larvæ, which are rendered more lively by water, and cling too firmly to the tissues of the ear to be syringed from their position. [A drop or two of chloroform or ether will promptly kill larvæ in the ear. They can then be removed by forceps, but only by an expert.—Rep.]

Facial Paralysis of Otitic Origin.—A. CARTAZ points out two ways in which facial palsy may be produced by inflammation in the drum-cavity (*Archives Internationales de Laryngologie*, 1896). The first cause named is compression of the nerve, by exudation, hyperæmia, or swelling of the mucous membrane in the tympanic space. The second is by neuritis by infection from the inflammation in the drum, and is the more frequent cause of facial palsy. He presents two illustrative cases; the palsy in the cases due to compression being promptly relieved by paracentesis of the membrana and an

escape of secretions from the drum-cavity. The case due to neuritis of the facial nerve was relieved after four months of treatment, chiefly by the constant electric current every two or three days.

Surgical Treatment of Diseases of the Attic and Mastoid Process.—A. BRONNER (*British Medical Journal*, October 17, 1896) has presented a very valuable consideration of the technique and recent modifications in the surgical treatment of the above-named diseases. In this paper we are informed that "diseases of the attic and mastoid process are very common, and if not operated on early and with great care, they are extremely fatal. Many cases are seen by the aural surgeon in which no operation was thought necessary or performed until the disease had spread to the brain, or in which the operation has been restricted to a Wilde's incision or the use of the gouge or gimlet." The latter is practically the Schwartze operation, and is very good in acute cases—*i. e.*, in those occurring as a complication of acute otitis media, and was in universal use in mastoiditis of all forms until 1889. In this latter year Küster recommended that in all cases in which the middle ear was extensively diseased we should not be content with Schwartze's operation, but should also remove the whole of the posterior wall of the osseous external meatus, and in the same year von Bergmann suggested that in addition to the posterior wall the upper wall of the bony auditory canal should be removed. In 1892 Stacke suggested his method of operating in chronic cases, and this is now adopted in such cases. In this operation of Stacke a long incision is made behind the ear, about half an inch from the line of insertion of the auricle, the cutaneous external meatus is loosened and cut across as near the drum-membrane as possible, and the whole ear drawn forward. The remnants of the membrane and the two largest ossicles are then removed, a protector is then placed in the attic, and the osseous wall of the attic, or the tympanic plate, is chiselled away. The upper and outer wall of the external meatus and the outer wall of the mastoid antrum are then removed in the same way. A large cavity is thus formed, consisting of the middle ear, the attic, and the antrum. The ear is then replaced and the wound stitched up or left open, according to the extent and nature of the disease.

Macewen and Horsley prolong the incision round the top of the auricle, and then draw the whole of the ear downward. Bronner prefers this method, as it gives a better view of the diseased parts, after the membranous canal is cut across and laid open at its top. Macewen also uses a burr impelled by a dental lathe, instead of a chisel, to remove the bone. The great advantage of Stacke's operation is that we are enabled to carefully examine the affected region, to remove thoroughly all diseased parts, and to readily watch and control the field of operation during the process of healing. In order to keep open the large cavity thus formed and have it covered with epithelium, the cutaneous external meatus is cut through horizontally in one or more places, well into the auricle, and a flap or flaps are formed which are stitched to the edges of the external incision or to the periosteum. In some cases the subcutaneous tissue of the flap may be removed and the skin placed directly in contact with the walls of the cavity formed by the operation. (Lake.) In cases of cholesteatoma a permanent opening is maintained

behind the ear, by forming a flap of the skin behind the ear and inserting it through the external wound into the cavity. Bronner further says: "The symptoms of disease of the attic and the mastoid process are often well marked and evident. Frequently, however (and these are the most dangerous cases), the symptoms are few and obscure, and it is most difficult to diagnosticate how far the disease has spread and to know if we should operate or not. If we are thoroughly acquainted with the local anatomy and the technique of the operation, the danger attending the operation is very slight. We make exploratory incisions in obscure abdominal cases, why not in obscure mastoid cases? Surgeons, as a rule, and certainly general practitioners, seem to treat diseases of the mastoid with something like contempt. They do not seem to realize the danger of cerebral complications, and they often fail to recognize that early operative treatment would frequently save the patient's life."

Otitic Sinus Thrombosis.—WEISSGERBER reports a case of otitic sinus thrombosis successfully treated by operation on the sinus and jugular (*Deutsche medizinische Wochenschrift*, 1897). The patient was a healthy woman, aged twenty years, who had never suffered from any ear-disease until a week after a slight angina in August, 1896. She was then suddenly attacked with earache, which lasted twenty-four hours, and was finally relieved by spontaneous rupture of the drum-membrane. During the three days following this event the patient lay in bed, the ear discharging a little. At the end of this period the pain in the ear and discharge from it ceased, and the patient got up; but after getting out of bed she had a slight chill. Ten days later pain began again in the ear, and fever set in. The next day the patient had a chill lasting ten minutes, and again on the two days following she had chills. The pain in the ear had ceased, but the patient complained of general weakness, and was finally put under special care on September 13, 1896. At this time the patient appeared apathetic; her general condition presented nothing of special note, and her right auditory canal contained a little pus. Externally the ear and its vicinity showed no changes, though the mastoid process was tender on percussion. There were no changes in the neck in the line of the great vessels. On the evening of this day (September 13th) the patient had a heavy chill, lasting fifteen minutes, succeeded by a temperature of 40° C. and a rapid pulse. Acute purulent otitis, involving the mastoid cells, was diagnosticated, and opening the mastoid cavity was indicated. Consequently, the next day the mastoid cortex, which was healthy externally, was punctured and an inoffensive pus escaped. Further removal of the cortex revealed softened bone and granulations in the cells, antrum, and tympanic cavity. These cavities were cleaned out with a sharp spoon. The wound was then tamponaded with iodoform-gauze. On the next day (September 15th) the general condition of the patient was unchanged. Temperature 38.9° C. to 38.2° C., and in the evening another chill. On September 16th the temperature varied from 40.4° C. to 37.2° C., and on the next day from 38.2° C. to normal, but went up again to 40° C. The next day the inner wall of the mastoid was partly removed and the sigmoid sinus exposed. Beneath the sigmoid fossa and the sinus a little pus was found. Further interference in this region was stopped, and the jugular vein—which before the anæsthesia had been found a little

sensitive to pressure—was laid bare. No changes were found in this vessel or its neighborhood. It was ligated with a simple ligature in the middle of the neck. Succeeding this the wall of the sigmoid fossa was so far removed as to permit exposure of the sinus from the so-called knee downward for $2\frac{1}{2}$ cm. After incision of the thickened pus-covered sinus-wall, free pus escaped from the interior of the sinus, and the rest of the purulent contents was carefully mopped away. No firm occlusion, either by peripheral or central thrombus, was found. A little bleeding occurred from the peripheral end of the severed sinus, but this was checked easily with a tampon. The case now proceeded most favorably; there were no more pain, no chills, and on October 26th the patient was permitted to leave the hospital.

As the author states, this case shows the advantage of operating in sinus-thrombosis while the thrombus is confined to the mastoid portion of the sinus.

An Acute Syphilitic Affection of the Ear.—E. A. CROCKETT describes an acute syphilitic affection of the ear, probably of the internal ear (*Boston Medical and Surgical Journal*, February 11, 1897). This affection consists in very sudden and severe deafness, more or less severe vertigo, and violent tinnitus occurring in persons previously free from ear-disease, but who have had syphilis not long before the ear-symptoms showed themselves. "This complex of symptoms should always suggest syphilis, and will be found to be caused by it in the large majority of cases where there has been no previous ear-trouble. We do not meet the same group in the rare cases of labyrinthine hemorrhage or tumor, and also in the rare and sudden fixations of the stapes which occur in the deep middle-ear thickenings. In these cases the history and hearing-tests, or, in case these fail, the treatment will immediately show us the probable cause." In the syphilitic cases the watch-and-voice-deafness is marked, and the tuning-fork of middle register is wholly lost to bone-conduction, but remains "fair for air-conduction." "The acute labyrinthine processes, on the other hand, show a marked loss of high tones in all cases, and in the more severe ones a total deafness by both air- and bone-conduction over a greater part of the region." The pathological process in these cases is not well understood. The clinical evidence would seem to be in favor of an effusion into the labyrinth as a cause of the particular group of symptoms we are considering. The early tertiary or late secondary period seems to be the favorite time for this particular lesion. Close examination will reveal the fact that only the auditory nerve is affected, which should aid in the differential diagnosis. The administration of mercury and iodide of potassium to the maximum limit will often be of no avail. "Here the subcutaneous administration of pilocarpine up to its full physiological limit will be of great service. The improvement in hearing and the diminution of vertigo following the administration of this drug is in acute cases little short of marvellous."

Labyrinthine Vertigo.—GELLÉ points out that labyrinthine vertigo depends upon a number of causes (*La Tribune médicale*, July 16, 1896; also *Thérapeutique Gazette*, December 16, 1896). When it is due to anemia of the labyrinth the symptoms are vertigo, subjective noises in the ears, and a tendency to syncope. It is sometimes seen in persons who have suffered

from chronic diarrhœa or other diseases impairing the general nutrition, and in cases of prolonged lactation or of convalescence from grave diseases; in cases of marked albuminuria, in cachectic affections, in dilatation of the heart, and similar disorders. Arteriosclerosis, senility, diabetes, and bleeding hemorrhoids may also provoke it. It is sometimes due to local thickening of the tympanic tissues, particularly of the membrana tympani. In many of these cases there are associated with the vertigo hyperæsthesia and pain. The remedies recommended are the glycerophosphates and a tonic regimen, the use of stimulants, the employment of milk and iodides if arteriosclerosis or cardiac disease is present. The use of the milk-diet, with a few drops of the tincture of strophanthus, or small doses of sparteine or caffeine, alternated with fluid extract of kola, has proved valuable. Should syphilis be the cause, of course antisyphilitic remedies must be employed. Should the vertigo be associated with middle-ear disease, local treatment of the ear becomes of the greatest importance. Here bromides, strychnine, and arsenic become of value. Gellé believes that sulphate of quinine is a valuable aid in many cases of persistent vertigo following primary or secondary disease of the internal ear. *Many cases, however, are best relieved of their vertigo by surgical interference with the bones of the ear.*

In ear-vertigo associated with toothache and neuralgia of the fifth pair of nerves sulphate of quinine is also useful and may be associated with small doses of aconite. Vertigo due to toxæmia of any kind must be treated by combating the peculiar poison producing it: malaria, gout, constipation, tobacco, salicylate of sodium, and excess of quinine may cause vertigo, and must be guarded against, therefore. Vertigo may be due to reflex causes, and this form is seen most frequently in hysterical and neurasthenic persons, and is frequently associated with migraine or facial neuralgia, never with hepatic or nephritic colic.

Gellé's conclusion is that in labyrinthine vertigo sulphate of quinine is of extraordinary importance, and that it is useful in the majority of instances.

Pyæmia after Acute Suppuration of the Middle Ear.—RÖPKE (*Archives of Otolaryngology*, vol. xxv. No. 4) reports a case of well-marked pyæmia fully established in the third week of the aural disease. The secondary infection in this case was evidently due to the improper treatment of the ear (the left) in the acute stage of inflammation by syringing with chamomile-tea and poulticing, as ordered by the family physician. The local mastoid symptoms were largely negative. There was nearly constant pain in the left temple. The eye-ground was not examined. Chills, rapid rise and fall of temperature, the permanently rapid pulse, even in intervals of normal temperature, tumor of the spleen, and the dry, cracked, thickly coated tongue were relied upon in establishing the diagnosis of otitic pyæmia from osteophlebitis. Suppuration of the mastoid cells and probably acute necrosis of the bone-tissue of this cavity were evidenced by the profuse discharge from the ear and the tenderness of the mastoid to pressure. No external symptoms of sinus-phlebitis were present. There was no œdema either in the region of the temple or at the posterior boundary of the mastoid.

The mastoid cavity and antrum were opened, found full of pus and granulations, and then completely cleared out. The vertical portion of the lateral

sinus was then found to be exposed by necrosis of its bony covering. The sinus-wall was free from disease, but it did not pulsate. It was punctured, but neither blood nor pus was aspirated. It was evident that the thrombus then shown to be present was solid, and *further interference with it was deemed unadvisable*. The wound was tamponed and bandaged. The temperature went down immediately, but came up the next day to 39.8° C. after a chill. The seventh day after the operation the spleen could not be felt. From the fifth day of the operation the temperature remained normal. On the tenth day the patient left her bed, and in one month she was dismissed from the hospital entirely well, with very good hearing in the previously diseased ear. (But the secondary infection of the middle ear from the improper treatment of the ear in the acute stages of its inflammation jeopardized the life of the patient.)

DERMATOLOGY.

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Gelanthum, a New Aqueous Varnish.—P. G. UNNA, of Hamburg (*British Medical Journal*, October 17, 1897), considers this substance capable of being made into an almost ideal aqueous varnish. It is a combination of tragacanth and gelatin. The preparation is made as follows: pieces of crude tragacanth are emulsified cold for four weeks with twenty times their volume of water. They are then treated with steam for one day, and pressed through muslin. An equal amount of gelatin is swollen up cold, filtered in a steam-filter, with long exposure to steam-pressure, which takes from it part of its power of gelatinizing. The mixture of the two is allowed to stand for two days in steam. After being pressed once more through muslin, it is mixed with 5 per cent. of glycerin, some rose-water, and 2 per 10,000 thymol, in order to prevent the growth of fungi.

Compared with other known watery varnishes, it has the following advantages: 1. It may be better spread. 2. It dries more rapidly and with a smoother surface. 3. It feels more cooling, on account of the greater amount of water it contains. 4. It keeps the drugs that may be incorporated with it suspended, and distributes them more evenly on the skin. 5. It prevents the drying of hygroscopic drugs, such as ichthyol. 6. It permits the addition of grease. 7. If protected from drying, it may be kept a long time. Unna looks upon it (after thorough experimentation) as a vehicle of the same perfection and trustworthiness as the salve-muslins, plaster-muslins, and zinc gelatins.

The power of the incorporation of the gelanthum with the most varied drugs (which it owes entirely to the tragacanth) is extreme. It may be mixed with 50 per cent. of ichthyol; 40 per cent. of salicylic acid, resorcin, and pyrogallol, up to 5 per cent. of carbolic acid, and 1 per cent. of corrosive sublimate, without influencing its value as a varnish. Two incompatible bodies, such as salicylic acid and zinc oxide, or ichthyol and salts, substances which combine in a watery solution or precipitate, remain in gelanthum without any mutual action.

The Etiology and Pathogenesis of Psoriasis.—KÜZNITZKY (*Archiv für Dermatologie und Syphilis*, Band xxxviii. Heft 3) presents the results of his study of psoriasis in the following thesis: It is not correct to say that psoriasis appears exclusively or chiefly in otherwise sound individuals. Psoriasis occurs upon real mucous membranes; also upon cicatrices. The parasitic theory of psoriasis is untenable. Psoriasis itself is not transmissible, but the disposition to psoriasis. The "disposing element" is an abnormal irritability of the central nervous system. The arthropathies in severe psoriasis are probably to be identified with neither rheumatism nor gout. These peculiar arthropathies variously observed in severe psoriasis are with great probability co-ordinate with psoriasis, and are to be traced to the same cause, viz., a chronic condition of spinal irritation. It is certain that psoriasis can arise directly in connection with psychic affections. It is just as certain that extensive psoriasis can disappear spontaneously in the briefest period. Psoriasis can appear strictly unilateral. Hyperæmia is the primary change in the pathogenesis of the psoriasis eruption. This hyperæmia is neither of an inflammatory nor paretic nature, nor is it the result of stasis; but it is to be regarded as an angioerethistic process. First attacks of psoriasis have been observed at the same time and place as mechanical irritation. One may with great probability assume that the conjunction of two factors is necessary for the occurrence of the eruption of psoriasis: the effects of traumata of whatsoever nature, usually trifling, upon vascular areas whose spinal centres are in a chronic condition of irritation. This condition of irritation of the spinal vasomotor ganglia may be inherited or acquired. It is possible that it is only functional, but the possibility remains that in many cases material lesions of the substance of the spinal cord exist; this can only be decided through systematic anatomical investigation of the spinal cord.

Eosinophilia in Psoriasis.—LEREDDE (*Annales de Dermatologie et de Syphiligraphie*, 1897, No. 2) at a recent *séance* of the Société Française de Dermatologie et de Syphiligraphie, communicated the results of his study of the blood in psoriasis from the point of view of eosinophilia. Thirteen patients were examined, and an average of three eosinophiles in a hundred leucocytes was obtained. Neither the intensity of the psoriasis nor its age seemed to have any influence. A patient, aged sixty-four years, affected with chronic bronchitis and emphysema, showed no eosinophiles in the circulation. Another patient of the same age, affected with a generalized and inveterate psoriasis, presented an eosinophilia of six per hundred; but this patient had recently had an intestinal trouble and had been subjected to an energetic

treatment with pyrogallol. Leredde's researches confirm the results obtained by Canon, who observed an average of 3.72 eosinophiles per hundred. As the result of his study, Leredde concludes that a slight increase of eosinophiles in the circulation exists in certain psoriatic patients; but this increase is not constant. A true pathological eosinophilia is observed exceptionally in some patients; this depends at times upon the treatment to which they have been subjected.

Oil-rubbing in Dermatological Practice.—H. S. PURDOR (Dublin Journ. Med. Sci., January, 1897) directs attention to the value of the ancient plan of treating chronic diseases by this means. Rubbing with oil, to avoid fatigue, in the case of invalids should be done by another, and is especially useful for delicate children and youths. The weight in a few weeks will be increased by several pounds. Good olive oil and cacao-butter, perfumed with oil of bitter almond or bergamot, are recommended. Ichthyosis, pityriasis rubra, chronic squamous eczema, and scarlatina are especially benefited by such oils.

The Anatomy of Pityriasis Versicolor.—WAELESCHE (Archiv für Dermatologie und Syphilis, Band xxxviii, Heft 2), supplementing his earlier communications concerning the anatomy of the hyphomycoses, discusses the histopathology of pityriasis versicolor. The fungus is localized chiefly in the middle and basal portions of the corneous layer of the epidermis. In the middle portions are more or less dense masses of spores, and between these a thick network of fungus-threads, while in the basal parts only mycelia are to be observed. In the upper parts of the corneous layer the elements of the fungus are found in trifling quantity. The middle portions of the horny layer, where the fungus is abundant, are separated by the spores and mycelia, giving rise to the scaling characteristic of the affection. The growth of the fungus does not go beyond the basal parts of the corneous layer. In the region of the hair-follicle mycelia are found only in those layers of the infundibulum which are continuous with the stratum corneum. The microsporon is never found in the internal root-sheath, nor in other parts of the hair-follicle which are derived from the stratum mucosum. The stratum mucosum never shows any pathological changes; the sebaceous and sweat-glands appear normal, and the hairs are free from fungus. In the derma, especially beneath the densest masses of fungus, slight hyperemia of the superficial capillaries is found, as well as a small amount of exudation around these and the vascular loops in the papillae.

Multiple Gangrene of the Skin.—HENTNER (Archiv für Dermatologie und Syphilis, Band xxxviii, Heft 2) reports a new case of multiple gangrene of the skin. The patient was a nervous, anæmic girl, twenty-one years of age. After a burn upon the left hand a vesicular eruption attended by severe stinging pain appeared, at first limited to the left arm, but later distributed over the whole body. With the evacuation of the contents of the vesicles upon the left arm discoloration occurred, and an eschar formed which fell off after a considerable time. The defect healed with the formation of scar keloid. Upon other portions of the body the lesions behaved somewhat differ-

ently. The blebs were tensely filled with pure serum or serum and blood, and ruptured after a short time, laying bare the corium; these healed by granulation without the formation of an eschar. After several outbreaks recovery took place, the affection having lasted over a year. The reporter believes the nervous system plays an important rôle in the disease, which depends, in his opinion, upon a trophoneurotic process.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF
J. SOLIS-COHEN, M.D.,
OF PHILADELPHIA.

Rhinopharyngeal Growths.—DR. JOHN A. WYETH reports (*New York Medical Journal*, 1897, No. 14) the removal of large neoplasms of the nasopharynx and antrum maxillare by an original method, less mutilating than the ordinary methods by access externally; but for its detailed description we must refer to the original article.

Neuroses of the Larynx.—At the meeting of the Laryngological Society of London (*Proceedings of the Laryngological Society*, March 10, 1897) a number of interesting cases, for the details of which we must refer to the proceedings, were exhibited as follows:

A case of functional aphonia, with ventricular band phonation, in an unmarried lady, thirty-six years of age, shown by DR. GRANT.

A case of double abductor and tensor paresis in a tabetic subject in an elderly man, shown by DR. GRANT.

Double abductor paralysis, with new growth at base of tongue, shown by DR. ST. CLAIR THOMSON. This case was reported by the late Dr. Morell Mackenzie, in the *British Medical Journal*, December 24, 1870, and a noisy breathing and other conditions were attributed to the results of a stab-wound in the neck.

In the recent discussion upon this case MR. BUTLIN thought that the tumor at the base of the tongue did not look like carcinoma, and was possibly a tertiary lesion; while DR. SEMON, after alluding to the paralytic features in the case, expressed the opinion that as the patient had had syphilis prior to the infliction of the injuries, it was possible that all the various nerve-lesions might be the result of cerebral syphilis.

DR. PERMEWAN reports (*Journal of Laryngology, Rhinology, and Otology*, March, 1897) a case of bilateral abductor paralysis in a female child, five years of age, in which tracheotomy became necessary. The cause of the paralysis, which is still persistent, has not been made clear.

DR. P. WATSON WILLIAMS, of Bristol, reports (*Journal of Laryngology*,

Rhinology, and Otology, March, 1897) a case of unilateral paresis of the left vocal band in a medical student who had been seeing cases of diphtheria, but was in good general health. The left abductor was paralyzed and the adductor was parietic, the healthy cord crossing the middle line in phonation. Local faradization and the administration of strychnine and sodium salicylate so improved the condition in six days that there was only left a pure left abductor paralysis, which subsequently became paresis only, and finally became still less marked.

Dr. Williams attributes the lesion to rheumatic neuritis. He called attention to the fact that the adductor muscles had recovered before the abductors, and mentioned an instance of a child whose right vagus had been divided during an operation upon the neck, the cut ends being sutured immediately, and in whom the adductor recovered in a few months, leaving an abductor paralysis only.

These cases afforded clinical evidence that the adductors exhibit a decided tendency to recover sooner than the abductors—a reverse confirmation of the demonstration of Semon of the proneness of the abductors to succumb earlier than the adductors.

Peculiar Case of Foreign Body in the Trachea.—Under the heading, "Papilloma of Larynx, with a Peculiar Accident," DR. NORTON L. WILSON, of Elizabeth, N. J., reports (*The Laryngoscope*, 1897, No. 4) a case in which tracheotomy had to be performed in a child three years of age, for papilloma of the larynx, and in which an intubation-tube was introduced subsequently for purposes of pressure. The first time the nurse removed the inner tube from the tracheal canula the intubation-tube fell into the fenestrum of the canula, and the two instruments became fastened. They were extricated by means of an incision in the trachea above and below the canula.

[This is an exemplification of the objections that can be urged against the use of fenestrated canulas; on the other hand, the presence of the canula prevented the intubation-tube from slipping through the trachea and becoming impacted in the bronchus.]

Foreign Body in the Œsophagus.—DR. ARTHUR AMES BLISS reports (*International Medical Magazine*, 1897, No. 2) an iron staple removed with forceps from the œsophagus after having been located by means of the Röntgen rays.

Necrosis of the Sphenoid.—DR. A. A. FORCHER, of Montreal (*Revue Internationale, Rhinologie, Otologie, and Laryngologie*, 1896, No. 10), describes a very unusual case of syphilis in which, among other things, the entire body of the necrosed sphenoid became dislodged during a repast, with abundant hemorrhage and paroxysms of suffocation. Despite assiduous treatment the disease continued to progress, eventually destroying the tongue almost in its entirety and terminating fatally seven years after the elimination of the necrosed sphenoid.

Lateral Frenula of the Lips—a New Point in the Anatomy of the Mouth.—In the *Archiv. für Pathologische Anatomie und Physiologie und für Klinische Medizin*, vol. cxlvii., No. 3, DR. B. VON DZIERZAWSKI describes

for the first time, as far as he knows, some lateral frenula of the lips which he has found very common, and of which he enumerates four types. He states that they are as constant as the central frenulum of the lower lip, and should be recognized as regular anatomical structures.

Sternutation.—In the *Gazette Hebdomadaire de médecine et de chirurgie*, March 28th, DR. MARCUS cites a remedy for paroxysms of sneezing, in which he recommends firm compression of the *alæ nasi* upon the septum, between the thumb and forefinger, to be continued from ten to fifteen seconds, during which time breathing may be performed through the mouth. If there is still any tickling or renewed sneezing, the compression has not been kept up long enough; consequently it should be repeated. This treatment applies to sneezing not dependent on coryza.

Enlarged Turbinates in a Newborn Child.—DR. ELIZA H. ROOT reports (*New York Medical Journal*, No. 962, 1897) a case of a newborn child which was born cyanosed and was unable to take the breast. This inability to nurse was found due to intranasal obstruction. Feeding with a spoon was exceedingly difficult, and the child lived but a week.

On examination, three or four hours after death, the inferior and middle turbinated bodies were found greatly enlarged and engorged with blood, so that they completely occluded the passage. The superior turbinated body appeared normal. In the left nasal cavity the turbinated bodies were congested, but not to such an extent as to occlude the passage.

Chronic Suppuration of the Maxillary Sinus.—DR. LUC has devised (*Archives Internationales de Laryngologie* (reprint), 1897) a new operative procedure for the radical and rapid cure of this condition, which is both extremely ingenious and scientific. It consists in making an entrance in the neighborhood of the canine fossa, after the old method of Desault, then thoroughly scraping out the sinus, and then breaking through the lateral wall into the lower and anterior portion of the nasal passage for the purpose of putting in a drain through this artificial *hiatus*. The wound in the mouth is then closed with suture, and the patient is not allowed to take any food for twenty-four or forty-eight hours. Union is usually complete on the third day, and a permanent cure is effected in about six weeks. For details in dressing and after-treatment the original article should be perused.

Paralysis of the Pharynx.—In the *New York Medical Journal*, No. 961, 1897, DR. HEINRICH STERN reports an instance of paralysis of the pharynx as the most prominent phenomenon in a case of crossed hemiplegia of a syphilitic basis. The paralysis of the pharynx was so complete that a little water taken into the mouth could not be swallowed, but caused suffocation. The patient improved rapidly under specific treatment.

Mycosis of the Larynx.—DR. PRICE-BROWN of Toronto, reports (*Canadian Practitioner* (reprint), 1897) a case of intralaryngeal mycosis which appears to be only the second case on record, the writer stating that he has been unable to find more than one case recorded: one which was exhibited by

Havilland Hall to the London Laryngological Society in April, 1895. Hall's patient was a man, fifty-two years of age, and the lesion was situated upon the left arytenoid cartilage. Price-Brown's case occurred in a schoolboy, nineteen years of age, who was quite well until January, 1897, when he took cold with a severe cough, chiefly night and morning, sometimes for a half hour's continuance. About the middle of February he commenced to lose his voice. He expectorated a good deal of sputum loaded with streptococci, had severe laryngeal pain after coughing, and occasional slight dysphagia. On laryngoscopic examination, April 2, 1897, several white spots—one as large as a small grain of wheat—were seen upon the left ventricular band, near the centre and posterior end, and projecting above the surface. A similar spot was seen on the right ventricular band in front of the arytenoid. There was no areola, and no other lesion of the mucous membrane, except hyperæmia of the arytenoid and vocal band, probably due to the cough.

Treatment with frictions of lactic acid, chromic acid, and silver nitrate successively, was worse than useless, the leptothrix seeming to develop a greater vegetative power by the stimulation it had received. Finally, the electric cautery was applied in such a manner as to produce destructive sloughs of the mucous membrane supporting the vegetation, and thus the reproduction of vegetation was overcome.

When the patient left for home several weeks later he had gained six pounds in weight, and his spirometric pressure had increased from 150 cubic inches to 215. At the date of the report a letter stated that the patient was quite well.

OBSTETRICS.

UNDER THE CHARGE OF

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Dystocia due to Hydrocephalus.—In the *British Medical Journal*, May 15, 1897, ROBERTSON reports the case of a primipara who, during labor, had severe hemorrhage which recurred with labor-pains. On examination the left hand and forearm were protruding. Under chloroform version was done and the breech brought down. With considerable difficulty the head was delivered, when the cause of the delay was found to be a marked hydrocephalus in the infant. The mother made a good recovery. The child was still-born.

Abdominal Pregnancy at Term, with Operation at the Twelfth Month, and Recovery At a recent meeting of the Obstetrical Society of London, TAYLOR (*British Medical Journal*, May 15, 1897) reported the case of a patient

who thought that she became pregnant twelve months before the operation. The movements of the child were unusually distinct and painful. During the pregnancy there was no acute pain or sudden illness or fainting. The child was removed by abdominal section, and the placenta, of ordinary size, was found covering the pelvic inlet. It was attached by a thick band of omentum and by several adhesions to the intestine. Forceps were applied to the vessels and the placenta removed. The child had perished some months before the operation, but the mother made a good recovery.

Rapid Death after Labor, from Infectious Meningitis.—At a recent meeting of the Obstetrical Society of France, CROZAT (*Gazette Hebdomadaire*, 1897, No. 35) reported the case of a patient who was well during pregnancy and who had a normal labor. Two days after delivery she suddenly became comatose, and died in twenty-four hours. Autopsy revealed the fact that the patient perished from suppurating meningitis, and examinations of the pus with control-experiments showed that a pure culture of the pneumococcus was the cause of the infection.

What Ought Midwives to be Taught?—In the *Practitioner* for May, 1897, HERMAN answers this question briefly as follows: the duties of a midwife are to attend a patient during and after a normal labor. She must understand antisepsis. She must know the causes of hemorrhage, and how to control them. She must be able to recognize malpresentations and pelvic disproportion. She must also understand the normal forces of labor and learn to recognize a variation in them. She must take precautions against ophthalmia, and be able, if necessary, to resuscitate a child. Her knowledge must also include the early symptoms of disease in young infants. A thorough acquaintance with the normal puerperal state should be included in her equipment, and she must be able to diagnosticate puerperal disease. The amount of knowledge which the midwife is thus expected to have is certainly far in excess of that possessed by many. She must, however, be looked upon as an evil which cannot be wholly avoided. She is dangerous because she is rarely able to recognize the first symptoms of a serious complication, and such are so sudden in obstetric practice that the life of mother or child may be lost before she can summon one competent to deal with the emergency. While it is desirable, if midwives must exist, that they be as intelligent as possible, it is certainly far better to extend the outpatient work of maternity hospitals with graduate instruction, so that the field for the midwife can be limited as much as possible.

Obstetrical Paralysis in Infants.—In the *Brooklyn Medical Journal*, 1897, No. 5, HAYNES reports three typical cases of paralysis following difficult birth. In the first the head was born, but the shoulders became impacted. A towel was placed about the child's neck, and by strong traction and pressure the infant was delivered. Paralysis of the right upper extremity and injury of the clavicle occurred. The child was making at the time of the report a gradual recovery. The cervical glands were thought to have been injured in this case. In the second patient the child had a long forceps-delivery, with traction upon the arm. Paralysis of the upper extremity fol-

lowed, and no improvement was observed for more than a year after birth. Under continued electrical treatment a slow return of natural function was observed. In the third case the mother was a small woman, her children being relatively large. On the third day after the birth of her second child, by forceps, paralysis of the right arm was noticed. Gradual improvement under massage and electricity ensued. In these cases the prognosis depends upon the extent and character of the lesion and the early use of the proper treatment. This consists in proper bandaging, in flexing the elbow, and, in addition, the use of friction, massage, douching, or sponging, and passive motion. If possible, the faradic current should be used after a few weeks. A mild galvanic current may also be employed. Gymnastic exercises, when the child is old enough, should be added.

Successful Labor at Term in Contracted Pelvis, by Version.—BUDIN (*Gazette Hebdomadaire*, 1897, No. 35) reported at the Obstetrical Society of France the case of a patient who had a contracted pelvis whose true conjugate was found to be 7 cm. The patient's husband declined symphysiotomy, and hence version was performed before the membranes ruptured, after the patient had been in gradual labor forty-five hours. The circumstances were favorable for the descent of the child, and the head was delivered by introducing the hand to secure flexion, while the external hand made pressure above the pubes, and an assistant made traction with a loop of tape upon the child's leg. The living child was successfully extracted by this manœuvre.

Pistolshot-wound of the Pregnant Uterus and Fœtus.—In the *Münchener medicinische Wochenschrift*, 1897, No. 19, NEUGEBAUER reports the case of a patient, eight months pregnant, who was shot in the abdomen with a pistol loaded with large shot. The patient was brought to a hospital, and as hemorrhage was present from the wound the abdomen was opened. The shot were found to have penetrated the uterus on the right side, two fingers' breadth below the insertion of the Fallopian tube. The uterus was incised and the child and placenta removed, four No. 1 shot being found in the placenta. The edges of the wound in the uterus were resected and the uterus closed by suture. As the intestine was not injured, a gauze drain was placed in Douglas's pouch and the abdomen closed. The child was killed by the shot, which penetrated the thorax and heart. The patient suffered from peritonitis, and pneumonia and suppuration occurred. On the eleventh day, as the abdominal wound had been closed and the uterus had not healed, the abdomen was reopened and the uterus drawn up and amputated at the neck, the stump being fixed in the lower angle of the wound. The patient made a very tedious recovery.

The Treatment of Uterine Rupture.—In the *Wiener klinische Wochenschrift*, 1897, No. 12, LEOWITZ concludes an extended paper upon this topic as follows: these cases demand two sorts of treatment; the first is the delivery of the child; the second the treatment of the tear in the womb. As regards the first, the child should be delivered through the vagina if possible, especially when the greatest portion of its body is high within the pelvis when the physician sees the case, and also when a positive diagnosis

of rupture cannot be made. If, however, the rupture is diagnosticated, and the child is still within the uterus, delivery through the vagina should not be undertaken if it will increase the injury to the uterus, and thus add to that already existing. If the child has entirely escaped into the abdomen, then abdominal section must be performed. This is especially the case when the birth-canal is not dilated, when contracted pelvis is present, and severe hemorrhage occurs. If the child is living after uterine rupture, abdominal section gives it the best chance for life. It is often better to extract a dead child by abdominal section than to increase the injury to the uterus by other modes of delivery.

So far as the treatment of the rupture in the uterus is concerned, the use of the tampon and compression of the wound are demanded only in mild cases. It is occasionally possible to suture the tear by operating through the vagina, although this is not usual. If the conditions are favorable, abdominal section should be performed and the tear in the uterus sutured in that way. Unless, however, the conditions are favorable for securing union, this must not be attempted. It is better to extirpate the uterus through the abdomen, if necessary, as it enables the operator to determine the presence or absence of injury to surrounding organs. In the presence of bleeding and collapse the most rapid method of operating is demanded. This consists in abdominal section, the use of the elastic ligature, with supravaginal amputation of the uterus. So far as results go, in patients who can be treated in hospitals, abdominal section with uterine amputation is best. When patients have not the advantage of such treatment, the use of the tampon in cases of moderate injury is often successful.

GYNECOLOGY.

UNDER THE CHARGE OF

HENRY C. COE, M.D., M.R.C.S.,
OF NEW YORK.

The Use of Steam within the Uterine Cavity.—PITHA (*Centralblatt für Gynäkologie*, 1897, No. 22) reports the results of his observations in Pawlik's clinic, extending over two years and including forty-six patients. The deductions are also based on examinations of six uteri removed from four to fourteen days after the application of steam.

The technique is quite simple. A small kettle, fitted with a thermometer, is connected with a double-current uterine catheter by means of rubber tubing; a wooden handle on the instrument protects the hand of the operator. The temperature is raised to 105°–115° C., and after the steam issues from the holes in the catheter the instrument is cooled to avoid burning the vagina, and is then introduced into the uterine cavity. The steam is then allowed to escape for one minute. It condenses within the uterine cavity, where its action is really due to the heat from the catheter and the hot water. Nar-

cosis is not necessary, as most of the patients bear the application easily. Active uterine contractions followed, and in some cases were quite violent, attended with reflex vomiting, but there were no other unpleasant consequences. Sloughing occurred, and was not completed before the fourteenth day, the endometrium not being entirely regenerated until four weeks had elapsed, showing that the cauterizing effect was quite as profound as after the use of the Paquelin. Twenty-eight patients, with hemorrhagic endometritis, treated in this manner were discharged cured, and ten with hemorrhage following abortion; in the latter, decidua remains were first removed with the curette before applying the steam.

The use of this agent is also highly recommended in cases of malignant disease of the corpus uteri.

The advantages claimed for this method of intra-uterine cauterization are the ease and rapidity with which it can be effected in a clinic, the immediate hemostatic effect, and the deep slough which is caused, as well as the freedom from untoward results. The after-treatment is simple. The patient is kept in bed until the slough has entirely separated, the vagina being irrigated and tamponed lightly with iodoform-gauze. No intra-uterine injections are given. Among the disadvantages the writer mentions the unequal character of the cauterization and the fact that the after-treatment is more prolonged than after curettement. He is not willing to assert that "vaporization" is preferable to the latter operation.

Separation of the Abdominal Wound after Cœliotomy.—BUETTNER (*Ibid.*) reports the following case illustrating the disadvantages of catgut sutures. In a case of cœliotomy for fibromyoma complicating pregnancy (fifth month) the peritoneum, muscle and fascia, and skin were closed separately with continuous sutures of catgut, additional sutures of the same material being passed through the entire thickness of the abdominal walls, which were observed to be unusually relaxed and atrophied in the median line. On the ninth day the deep sutures were removed, and the wound was found to have healed perfectly. Soon after the patient was seized with a fit of coughing, and the wound burst open to the extent of four inches, allowing the escape of coils of intestine which were adherent to one another and to the parietes by recent bands. The gut was irrigated with saline solution, returned to the cavity, and the wound, after freshening of the edges, was closed with interrupted silk sutures, including all the layers. The patient's recovery was uneventful.

[The writer infers that catgut should only be used to unite the peritoneum. He has evidently had no experience with chromicized gut, or nonabsorbable, sutures for uniting the fascial edges—H. C. C.]

Pregnancy following Transplantation of the Ovaries.—GRIGORIEFF (*Ibid.*) details some interesting experiments in rabbits in which he excised the ovaries and transplanted them either to points in the broad ligaments, near the uterine cornua, or even to pockets formed in the peritoneum at distant sites. The animals were killed six months later, after they had become pregnant, and careful studies were made of the gross and microscopical anatomy of the pelvic organs. It was demonstrated conclusively in

each case that no ovarian tissue remained at the original site of the ovary.

The writer's deductions are: 1. The favorable results obtained are to be attributed largely to the rigid aseptic technique observed during the operations. 2. It is certain that the transplanted ovary continues its normal development after transplantation, and that nearly any portion of the pelvic peritoneum may be selected as its new site. 3. The follicles undergo the usual processes of development seen in the normally situated ovary. 4. Single follicles mature, rupture, and corpora lutea are formed in a perfectly normal manner. 5. Pregnancy may occur and continue to full term after transplantation of the ovaries.

Asthma during Menstruation.—KATZ (*Deutsche med. Wochenschrift*, 1896, No. 50) reports the case of a healthy multipara, aged thirty-two years, who had suffered for a year with attacks of asthma, which appeared only at the time of menstruation, ceasing as soon as the flow stopped. The physical signs were typical of bronchial asthma. The writer explains the phenomena by irritation of the sympathetic nerves and resulting spasm of the bronchial muscles, due to increased blood-pressure in the abdominal viscera at the time of menstruation.

The Influence of the Pelvic Organs upon the Urinary Secretions.—BOSSI (*La Gynécologie*, 1897, No. 2) publishes the results of a series of observations undertaken with the purpose of determining the variations in the daily quantity of urine, and in the amount of urea, in women with pelvic disease, both before and after operation. It was found that there was a decided diminution in both for several days after radical operations and also during profuse uterine hemorrhages. The data are too few to allow of any useful generalizations.

PÆDIATRICS.

UNDER THE CHARGE OF

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ASSISTED BY

THOMPSON S. WESTCOTT, M.D.,
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Treatment of Excessive Inflammatory Reaction after Vaccination.—LUCAS (cited in *Revue mensuelle des Maladies de l'Enfance*, July, 1897) refers to the excessive inflammatory reaction often observed after the vaccination with calf-lymph. In some cases this reaction becomes a complication of considerable gravity; the pustules tend to become confluent, the zone of phlegmasia extends, the axillary ganglia become greatly enlarged, and the arm œdematous. The most satisfactory treatment of this condition, Lucas

states, is to powder freely the affected region with iodoform and apply a dry antiseptic dressing to preserve the pustules from mechanical irritation. Under such treatment he says he has succeeded in checking the inflammatory process in twenty-four hours, the pustules being transformed into dry crusts, the redness disappearing, the glands diminishing in size, and oedema rapidly subsiding.

A Mixed Infection in Varicella.—BOLOGNINI (*La Pediatria*, 1897, No. 3, p. 76) reports a circumscribed epidemic of varicella in which twelve out of the fifteen cases showed a rare terminal complication. In all of the twelve children the disease had followed its ordinary course up to the time of desiccation of the vesicles; but then, instead of drying up, they increased in size, and at the end of twenty-four hours were changed to bullæ. A few hours later these bullæ ruptured and discharged a thick, whitish fluid, which was found to contain numerous staphylococci and some streptococci. In one case, the only one terminating fatally (abscess of the kidney), the cultures showed the streptococcus pure. All the patients had albumin in the urine, but showed no other signs of nephritis, and it disappeared at the time of desquamation. These cases confirm the observations of Hulot, Hutinel, and Labbé and others that staphylo-streptococcic infection may be a complication of varicella, and show that it may exist in nearly all the cases of a particular epidemic, though the prognosis is not ordinarily grave except in the presence of a visceral determination.

Gangrene of the Lung in Measles.—MÉRY and LORRAIN (*Société Anatomique de Paris*, March, 1897) report the case of a child of three years that died on the seventh day of measles, with signs of bronchopneumonia and fetidity of the breath. At the autopsy the left pleural sac was found to contain 200 grammes of effusion having a fetid, gangrenous odor. The lung was covered with a thick, false membrane. The lower lobe contained a wedge-shaped focus of gangrene the size of a nut; the centre was softened and contained thick, yellow pus with necrotic débris. Numerous foci of bronchopneumonia were scattered through the lungs. In the gangrenous focus there were found streptococci, a bacillus resembling the Klebs-Löffler bacillus, and bacilli resembling morphologically the streptothrix and a large, putrefactive germ. This focus was evidently consecutive to the bronchopneumonia. The infection was through the respiratory tract, as shown by the abundance of streptococci and diphtheroid bacilli about the bronchi and surrounding the gangrenous area.

Myositis in Scarlatina.—BRÜCK (*Archiv f. Kinderheilkunde*, 1897, xxi, S. 318) in a paper under this title reports three cases of non-complicated scarlatina in children, eight to fourteen years of age, in whom, fifteen to twenty-one days after the appearance of the eruption, there appeared muscular pains analogous to nenscular rheumatism. Their appearance was marked by a rise of temperature to 100° or 101°, affecting the muscles of the back(?) and of the thighs in one case, the muscles of the thorax in another, and those of the upper extremities, of the abdomen, and of the loins in the third. In all three there was corresponding functional disturbance (immobility of the

limbs and trunk, contraction of the abdominal walls) and asphyxia in the case in which the thoracic muscles were involved. There was no articular pain, and the condition yielded promptly to the use of salicylate of sodium continued for several days.

Thrombosis of the Veins of Galen following Scarlatina.—GOODALL (*Royal Society of Medicine and Surgery*, March 23, 1897) reports the case of a girl, eight years of age, who on the eleventh day of scarlatina had convulsions, followed in a few hours by general rigidity and coma. The temperature reached 107° before death. No albumin could be detected in the urine. The autopsy showed thrombus in the veins of Galen and the right lateral sinus. The choroid plexuses were covered with a thick coating of fresh lymph. The optic tracts showed red softening. The ears were normal, and but slight ulceration of the tonsils was present.

Fatty Degeneration of the Liver in the Gastro-enteritis of Nurslings.—THIEMICH (*Fiegler's Beiträge zur Pathologische Anatomie*, 1896, vol. xx.) records the results of histological examination of the liver in thirty-two nurslings that had succumbed to acute or chronic gastro-enteritis, in the service of Professor Czerny. With the exception of one child, two and one-half years old, all the subjects were less than a year old.

In all of the cases the examination showed the existence of fatty degeneration which, according to the lesion, presented three distinct forms. In the first class (nine cases), where the lesion was least marked, the organ had preserved its form, its consistence, and its normal size. The fatty infiltration was slight, and the fatty droplets, few in number, were found ordinarily at the periphery of the acini; the nuclei of hepatic cells took the staining well.

In the second group of twenty cases the liver was either increased in size or of normal dimensions. The infiltration, more marked than in the preceding group, occupied ordinarily the periphery of the acini; fat-droplets were found in the interior of the hepatic cells, where they replaced almost entirely the protoplasm and pushed the nucleus aside. In other cases, much more rarely, the infiltration was particularly marked about the ventral vein; the nuclei of the hepatic cells were pale and scarcely took staining.

In the third group (three cases), where the fatty degeneration had attained a maximum, the lesions were the same as have been described in the fatty liver. The organ was usually increased in size and soft in consistence. In preparations stained with osmic acid the whole field was occupied by large drops of fat in close juxtaposition, the normal structure being almost completely effaced. In the few cells partially preserved in structure the fat-drops were surrounded by a narrow border of protoplasm, and the nuclei were pale and crowded to the periphery of the cells. The nuclei of the connective tissue were deeply stained. In no part were healthy liver-cells encountered.

According to the author, the condition was not a simple infiltration, but a true fatty degeneration produced by the toxins elaborated in the intestine.

Employment of Thyroid Extract in Pædiatrics.—DOBROWSKY (*Archiv f. Kinderheilkunde*, Bd. xxi. S. 54) describes his observations in the treatment

of thirty children in Monti's clinic with thyroid extract. Nine were cases of goitre, 8 of prurigo, 1 of obesity, and 12 of idiocy or cretinism. To those less than two years old a half to one tablet of Merck's thyroïdine was given daily during the first week, and one to two tablets a day thereafter. Old children began with one or two tablets daily, and later took three or four, for three weeks at least, and often for three or four months. Each tablet contained 35 centigrammes of thyroïdine.

In all the cases a reduction of weight, varying from 500 to 3500 grammes, was produced; this effect being manifested toward the fourth week of treatment and not continuing after treatment was suspended. Return to the initial weight began ordinarily eight to fifteen days after the administration of the remedy ceased.

In parenchymatous goitre this treatment constantly produced a considerable diminution of the tumor, which could be observed after two or three days of treatment, and reached its maximum in the course of the third week; after this no further diminution occurred, though treatment was continued.

In cases of prurigo the itching ceased, the skin became more supple and the lesions disappeared. These effects were manifest in eight patients after several days' treatment; but in all the cases the suspension of treatment was followed by relapse within three weeks.

Contrary to the very encouraging experience of many other observers, Dobrowsky obtained practically no effects in cretins.

During this treatment the blood showed no modification in its composition, but all the cases exhibited a tachycardia without palpitation or dyspnoea, which lasted during all the period of treatment. Diuresis, as well as thirst, was increased. The urine contained a considerable increase of phosphates, and often notable quantities of indican, but no albumin or sugar.

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SPORADIC CRETINISM IN AMERICA.¹

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I. INCIDENCE OF THE DISEASE IN AMERICA. In 1893 I made a collective investigation on the subject of sporadic cretinism in this country, and was able to find only eleven cases. Since that time the profession has learned to recognize the condition, and I am able to-day to report upon sixty cases, including those already referred to. Of these twenty-seven have been recorded; for the others I am indebted to various physicians throughout the country who have kindly responded to my inquiries, and in many cases sent photographs.

(a) *Condition of the cases previously described.* It will be interesting to report on the progress of the patients who formed the basis of the first paper, in 1893.²

CASE I.—M. has been under my observation from January 10, 1892, at which time she was two years and three months old, and presented a typical picture of infantile myxœdema. I reported upon her case in the February number of the *Archives of Pediatrics* for 1895. The thyroid extract was started in March, 1893, and she grew four inches in the first fourteen months. She learned to walk and talk, ran about everywhere, and lost altogether the cretinoid appearance. I have seen this child at intervals of a few months ever since. She has continued to take the thyroid extract, and has grown and developed, and now nothing peculiar is to be noticed about her.

CASE II.—A cretin, nineteen years old at the time of observation, March 3, 1893, without any special evidence of myxœdema. She had a goitre in which the left lobe was more enlarged than the right. This

¹ Abstract of paper read on behalf of the Pediatric Society at the Congress of Physicians and Surgeons, Washington, May, 1897.

² AMERICAN JOURNAL OF THE MEDICAL SCIENCES, November, 1893.

patient took thyroid extract for a short time, without any special benefit. The treatment has never been systematically carried out by her mother.

CASE III.—A child, aged three and one half years when she came to the Johns Hopkins Hospital Dispensary, November 25, 1892, was a typical instance of infantile myxedema. She was, unfortunately, lost sight of.

CASE IV.—G. S., female, aged six years (Dr. Bullard's case). Dr. Bullard writes on April 14, 1897: "She has had no treatment, and is essentially in the same condition as when I wrote in 1893. She has grown little, if at all, and is a dwarf."

CASE V.—S. M., aged nineteen years (Dr. Brownell, New York Custodial Asylum, Newark, N. Y.). March 26, 1897, Dr. Brownell writes: "S. M. died about two years since in the Erie County Almshouse, Buffalo, to which she was removed shortly after the history sent you was taken. I regret to say that I have no subsequent notes of her case." Not treated.

CASE VI.—L. S., aged fourteen years (Dr. Van Sweringer, Indiana School for Feeble-minded Children). The patient died of acute tuberculosis in November, 1896. The case will be reported in full under the section on pathological anatomy.

CASE VII.—Martha L. Y., aged sixteen years (Dr. J. C. Carson, State Institution for Feeble-minded Children, Syracuse, N. Y.). The further history of this case is as follows: Treatment was begun September 4, 1895. At that time her height was forty and one-half inches and the weight fifty-seven pounds. After one month the change in her condition was striking. At the end of two months the entire skin was renewed, giving place to the velvety skin of an infant, and a new

FIG. 1a.



FIG. 1b.



growth of hair just appearing on the head. At the end of eight months she had grown three and one-eighth inches, and weighed sixty-two and one-half pounds. The teeth which have appeared since are eight incisors, one canine, and two second molars. The photographs (Figs. 1a and 1b) show the condition a year before and a year after treatment.

CASE VIII.—Willie V., and Case IX., Johnnie V. (Dr. Hoisholt, State Insane Asylum, Stockton, California). Dr. Clark writes under date of April 1, 1897, that the thyroid treatment was not tried, on account of the age. They present no changes.

CASE X.—Nellie R., aged fifteen years (Dr. Furness, Randall's Island Hospital, New York). Dr. Frederick Peterson reports this case in *Pediatrics* for May 1, 1896. He says: "Treatment was begun with five grains of the dried gland, which proved too much, and it was reduced to one grain daily. Improvement was noticeable in a few days. In the course of three months she grew thinner, gained two inches in height, cut several new teeth, her hair became more abundant, she assumed an intelligent expression, noticed everything about her, played with a doll, and had increased her vocabulary to twenty-seven words. At this time treatment ceased because of changes among internes and attending physicians."

CASE XI.—I. N., female, aged probably thirty-five years (Dr. A. E. Osborne, of the California Home for Feeble-minded Children). In a note from Dr. Osborne on April 1, 1897, he says: "I regret to have to say that our cretin died shortly after I forwarded you the notes relating to her. I really have nothing further of material interest regarding her."

It will be noted that of these cases eight were either not treated at all or the treatment was not thoroughly carried out; three cases have been treated with great improvement, and three have died.

(b) *Clinical summary of the collected cases.* We have had three additional examples of sporadic cretinism at the Johns Hopkins Hospital, the brief notes of which are as follows:

CASE XII.—J. L., aged about forty-four years, admitted to the Johns Hopkins Hospital, Surgical Department, for cystitis. He presented a very characteristic appearance of a cretinoid dwarf. He had a muddy complexion, dry skin, harsh, rasping voice. There was no goitre. He had a fair amount of intelligence, but he was in many ways infantile and childish. He received no special treatment.

CASE XIII.—Theophilia P., aged two years, was admitted to the Johns Hopkins Hospital December 18, 1895. It was very difficult to get a history, as the mother was a Pole, and did not speak English. This is the second child; natural at birth. There is no goitre in the family. The thyroid gland can be felt; seems a little large. She presents the typical aspect of infantile myxedema. Though of fair size for her age, she can neither sit nor stand. The child looks pale; the skin of the face has a sallow, waxy appearance. The tongue is large, held out all the time. The expression of the face is dull and idiotic. The lower jaw drops, and she drools constantly. There are eight incisor teeth, and she is cutting a lower molar and the molars of the upper jaw. The eyelids are puffy, and the palpebral orifices look narrow. The skin of the face is rough, and there is a puffiness and myxedematous character of the skin of both hands and face. The head measures 45 cm. in circumference, 25½ cm. in the transverse, and 35 cm. in the antero-posterior. The anterior fontanelle is large, almost as much so as at birth. The posterior fontanelle is completely closed.

The abdomen is large and pendulous. The skin of the thighs, as shown in the photograph (Fig. 2*b*), hangs in folds. The child's length on admission was 65 cm. The blood-count gave 4,648,000 red corpuscles, 80 per cent. of hemoglobin, and about 11,000 leucocytes.

FIG. 2*a*.FIG. 2*b*.

On December 20th she was placed on the thyroid extract prepared by Dr. Abel. On beginning the treatment she weighed twenty pounds. Within two months, as illustrated in Fig. 2*b*, the condition improved remarkably. She took an interest in surrounding objects. The eyes had become bright and intelligent; the puffiness of the face and hands had almost wholly gone. As shown in the photograph, the palpebral orifices had become much larger. The tongue was not held out so far from the mouth, and the drooling had almost ceased. She remained in the hospital until September 1, 1896. The myxædematous condition disappeared entirely, she gained eight pounds in weight, and had thriven in every way. It is interesting to note in this case that from March 20th to April 4th, the child received no thyroid extract. She had had a little fever and bronchitis, and it was stopped. On the latter date it was noticed that the skin had become harsh and dry, the eyelids more puffy, and the child did not seem nearly so well.

CASE XIV.—Teresa T., aged two years, brought to the Johns Hopkins Hospital Dispensary April 9, 1896. Parents are Poles. Child at birth was natural. She has never walked or talked; cannot stand alone. She is very apathetic, but seems to understand everything. The mouth is held wide open. The tongue does not protrude. The face is broad; the eyelids are puffy; the nose is broad, the orifice of the nostrils very plainly to be seen. The mouth is large, the lips are full, and the cheeks flabby and relaxed. There is a waxy, sallow tint to the skin. The head is broad, parietal eminence marked, forehead low. The tongue is large; upper and lower incisors are just appearing. The subcutaneous fat over the body is abundant. There are no pads above the clavicles.

The belly is very prominent and pendulous. The general cretinoid aspect is most marked. The thyroid gland cannot be felt. There is no dulness over the manubrium. She was given the thyroid extract, but the parents did not return with the child for nearly eight months. She then seemed a little better, though still myxedematous. I saw her in May of this year, after she had been taking the extract for several weeks. She looked brighter, had grown, and had lost in part the idiotic expression.

Abstracts of the other forty-six cases will be given when the paper appears in the *Transactions* of the Congress.

The clinical summary of the cases is as follows:

Sex. Males 24; females 36.

Age. Under two years, 6; from two to five years, 12; five to ten years, 12; ten to fifteen years, 10; fifteen to twenty years, 7; twenty to thirty, 3; thirty to forty, 4; over forty years, 4.

Nationality. American, white, 12; colored, 1; Polish, 2; French, 1; German, 5; Swede, 1; Hebrew, 1; Norwegian, 1; Irish, 7; English, 1; Swiss, 2; Bohemian, 1; nationality not given, 23.

Locality. There is no region in the country in which the disease is endemic, nor does it appear to be more prevalent in those districts, as in Michigan and parts of Ontario, where goitre is common.

Condition of the thyroid gland. Goitre was present in 7; gland stated to be normal in 12; gland small in 2; gland not to be felt in 16; no note in 20.

II. THE RESULTS OF THYROID TREATMENT. No type of human transformation is more distressing to look at than an aggravated case of cretinism. It recalls Milton's description of the Shape at the Gates:

"If shape it might be called, that shape had none
Distinguishable in member, joint, or limb,"

or those hideous transformations of the fairy prince into some frightful monster. The stunted stature, the semi-bestial aspect, the blubber lips, *retroussé* nose, sunken at the root, the wide-open mouth, the lolling tongue, the small eyes, half closed with swollen lids, the stolid, expressionless face, the squat figure, the muddy, dry skin, combine to make the picture of what has been well termed the "pariah of nature."

Not the magic wand of Prospero, or the brave kiss of the daughter of Hippocrates ever effected such a change as that which we are now enabled to make in these unfortunate victims, doomed heretofore to live in hopeless imbecility, an unspeakable affliction to their parents and to their relatives. From a large number of photographs which I have received I have selected a set to illustrate the effect of treatment at different ages, from infancy to the thirtieth year, and illustrating also the influence at periods varying from two months to a year. The series has an educational value, as the pictures tell their own story, enabling the practitioner not only to recognize the victims of this affection, but

they emphasize as words cannot the magical transformation which follows treatment.

Fig. 3 shows the patient of Dr. Elsner, of Syracuse, New York.

FIG. 3a.



FIG. 3b.



The child was eighteen months old at the beginning of treatment, and the photograph shows a very characteristic state of infantile myxedema. Fig. 3b shows the state thirteen months after treatment.

FIG. 4a.



FIG. 4b.



Fig. 2 (given on another page) shows Case XIII. of the series. She was two years old at the beginning of treatment. Fig. 2b shows the condition after two months' treatment.

Fig. 4, the next case, is a child aged four years, a patient of Dr.

Jacobi and Dr. Fruitnight. The facies and general conformation are most typical. Fig. 4*b* shows the change a year and a half after treatment.

FIG. 5*a*.FIG. 5*b*.

Fig. 5 illustrates the case of Dr. Vinke, of St. Charles, Mo., a boy, aged six years. Fig. 5*b* shows the condition five months after treatment. In a year and a half he grew nine inches.

FIG. 6*a*.FIG. 6*b*.

Fig. 6 shows a patient of Dr. Dickson L. Moore, of Columbus, Ohio, a girl, aged nine years. The treatment was begun August 12, 1896.

Fig. 6*b* shows the condition seven months later, March 20, 1897. The child had gained four inches in height, and the entire appearance had changed remarkably.

FIG. 7*a*.



FIG. 7*b*.



Fig. 1 (shown on another page) presents a typical picture of a sporadic cretin, aged seventeen years, under the care of Dr. J. C. Carson, of

FIG. 8*a*.



FIG. 8*b*.



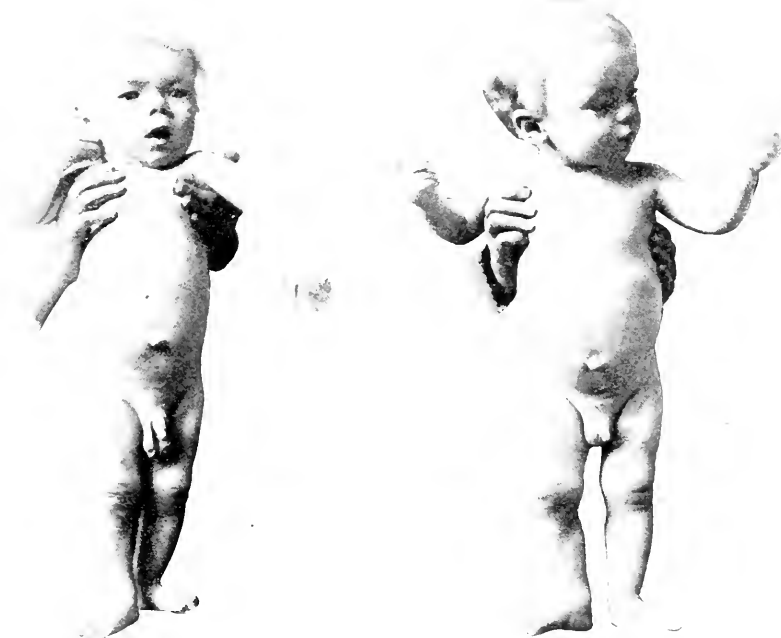
Syracuse, New York. Fig. 1*a* was taken a year before treatment, and Fig. 1*b* illustrates the condition a year after.

Fig. 7 shows a sporadic cretin at the age of thirty years, patient of

Dr. Sinkler. The height was $112\frac{3}{4}$ cm. Fig. 7*b* shows the condition a year after treatment. She had grown nearly 7 cm., and had lost much of the myxœdematous characters. This case is of special interest as showing the importance of the treatment even in adults.

I know of no single set of photographs which show in quite the same way the phenomenal change as in this series of pictures very kindly sent by Dr. Coyner, of Peoria, Ill.

Figs. 8*a* and 8*b* show the very characteristic appearance of a sporadic cretin, aged twenty-three months, length 28 inches, circumference of the abdomen 19 inches. Fig. 8*c* shows the change after three months' treatment; the abdomen measured 16 inches. Fig. 8*d* illustrates the

FIG. 8*c*.FIG. 8*d*.

condition after five and a half months' treatment; height 30 inches; abdomen measured 15 inches. Fig. 8*e* shows the change after seven and a half months' treatment; while the last picture, Fig. 8*f*, shows eleven months after beginning the use of the thyroid a perfectly natural-looking child.

1. *The character of the changes.*

(*a*) Bodily. Loss in weight, due to disappearance of the myxœdematous condition and of the fat, is noticed within a month or six weeks after the commencement of the treatment. The face becomes thinner, the palpebral orifices wider, the puffiness disappears from about the eyes,

the flabby supraclavicular folds melt away, the projecting abdomen diminishes in girth, and the child's figure becomes more shapely. Several of the photographs illustrate this in an interesting manner. This change is much more striking in young children of from three to six or eight years, but it is also well seen in the older patients. Nothing could be more remarkable than the change in the features in Dr. Carson's case, and even in Dr. Sinkler's case, aged thirty years, the change, as shown in the photograph, is most evident. The expression of the face is altered by the recession of the tongue, and in many instances the drooling ceases as the mouth is kept closed; this relieves in great part the idiotic expression.

FIG. 8c.



FIG. 8f.



Among the constructive and progressive alterations may be mentioned the loss of the waxy pallor of the skin, which becomes softer and much more natural looking.

The hair, too, changes, and becomes more abundant and finer. Several writers have referred very particularly to this remarkable change in the skin and hair, as though there had been a complete substitution

of the old by new skin and hair. In very young children teething proceeds rapidly; in older subjects, if the second dentition has not begun, the milk-teeth are shed and the permanent ones develop rapidly. No change is so remarkable as the increase in stature. As Dr. John Thomson remarks, "the natural impulses of growth, which were in abeyance in the thyroidless condition, are let loose." In my first case the little girl grew four inches in a year. Among the most remarkable in the collected series are the following: Dr. Friend's case gained eleven and three-quarters inches in one year and ten months, Dr. Vincke's case gained nine inches in one year and seven months, Dr. Noyes' case gained eight inches in four and a half months, and Dr. Edwin F. Wilson's case gained seven inches in six months.

Fig. 5 illustrates what an extraordinary alteration takes place after seven months' treatment. The loss of the squatness of figure, of the apparent disproportion between the head and the trunk, and of the characteristic attitude, and the disappearance of the lordosis are well illustrated. It is to be remembered that the rapidity in growth in some cases has led to increase of a lateral curvature and even to marked bowing of the legs.

(b) Mental change. Even within a couple of months the alteration in the mental condition is noticed. At any rate, the patients look much brighter and the face is not absolutely expressionless. This is very well seen in Fig. 2, illustrating the change after two months' treatment. As a rule, the younger the case the more marked is the mental change. Young cretins who have not learned to speak a word soon begin to talk in their play. In children between six and ten the effects are even more remarkable, and with the loss of the myxedematous condition there is a corresponding awakening of the mental faculties. In older patients the treatment is not so efficacious. In Case II. of my series, the girl, aged nineteen years, did not seem to be very much benefited, although it is true the treatment was abandoned by the mother after a short time. In other instances, as in Dr. Sinkler's case, the mental condition improved very much, even though the patient was over thirty years old. I know of no instance in which the treatment has benefited the condition of deaf-mutism.

2. *The dosage.* I have usually begun with a grain of the desiccated gland three times a day in young cretins. Its effects should be carefully watched, and the amount reduced if the pulse becomes more rapid or if there is fever. Older patients may take as much as five grains in the day, and the amount may be increased or diminished as the symptoms indicate. Young patients bear the remedy very well, and in a few months, if no improvement is noted, larger doses must be tried. Unpleasant effects are less commonly seen than in the myxedema of adults.

3. *The question of continuance of the treatment.* After the disappear-

ance of the myxœdema and the establishment of the processes of growth and development, a very moderate dose seems sufficient, one or two five-grain tablets a week. Intermision for a month or six weeks does not seem to be followed by any striking change, but an intermision for a longer time is followed by symptoms indicating a relapse. In my first case in the early part of this year the treatment was interrupted for two months, and the child became very languid and apathetic, and improved at once when the use of the extract was renewed.

And here the thought arises: Whom has suffering humanity to thank for this priceless boon? As with many great discoveries, no one man, indeed, no set of men. The points in the development of our knowledge of the function of the thyroid gland have been worked out in almost equal shares by physicians, surgeons, and physiologists. Gull and Ord, Kocher and the Reverdins did much; but to the experimental physiologists, in particular to Schiff, to Horsley, and to von Eiselsberg, we owe directly the experimental evidence which made possible the successful treatment of myxœdema and sporadic cretinism. That I am able to show you on these lantern-slides such marvellous transformations, such undreamt-of transfigurations, is a direct triumph of vivisection, and no friend of animals who looks at the "counterfeit presentments" I here demonstrate will consider the knowledge dearly bought, though at the sacrifice of hundreds of dogs and rabbits.

III. DIAGNOSIS. The number of cases which I have been able to collect indicates that the profession has rapidly learned to recognize sporadic cretinism. It is also evident, from statements and from photographs which I have received, that there are a number of conditions which are apt to be mistaken, and that even men in institution life have not very clear ideas upon the subject. There are several points to which I may refer.

(a) *The recognition of early slight cases.* After the third year the condition is, as a rule, diagnosed at sight, and advanced types offer not the slightest difficulty. The earlier the recognition is made, the greater is the prospect of complete recovery. About the eighteenth month the subject may present the aspect of myxœdema rather than of cretinism, and the swollen, waxy skin even suggests Bright's disease. Case I. of the series was supposed to have chronic nephritis. The failure of development, the inability to talk or to walk, and the retarded dentition begin to attract attention as the child reaches this period. The absence of expression, the open mouth, the large tongue, and the drooling suggest that something is wrong. The development may be so slow that a child of three years looks not older than fifteen months. There are, possibly, cases of thyroid insufficiency in young infants which correspond to the *myxœdème fruste* of the French, which may be readily overlooked. To this several writers have recently called atten-

tion. Dr. Bury,¹ in the discussion last year before the British Medical Association, states that he saw a baby a year old which had ceased to "get on." He became flabby, fat, lost his vivacity, and began to show a protuberant abdomen, a lax skin, and other cretinoid appearances. Treatment with small doses of the thyroid, one-fourth tabloid daily, speedily picked him up; he grew, became lively, and at the end of six months treatment was discontinued without retrogression. Such cases are probably due to transient, perhaps functional, disturbance in the thyroid. Herrick² also, in his recent paper, refers to the ease with which these milder cases may at first be overlooked.

(b) *The diagnosis from other types of idiocy.* Naturally enough it has been suggested that diminished or perverted function of the thyroid gland might be responsible for the mental and bodily defects in ordinary idiocy, and more particularly in dwarfs. The question is one deserving of careful study, particularly by those who have opportunities for clinical and post-mortem observation in large institutions.

The Mongol type of idiot resembles the cretin more closely than any other. Telford Smith, in speaking of this form, says: "Idiots belonging to the so-called Mongol type are those who most nearly resemble the cretin, both in physical aspect and in mental character. In idiots of this type we get the stunted growth, the dull, heavy expression, with open mouth and thick lips; the slow, deliberate movement, and hoarse, guttural, and monosyllabic speech; the mental apathy, and lack of spontaneity; the sluggish circulation, and sensitiveness to cold. A thickened condition of subcutaneous tissue is often found, with dulled cutaneous sensibility. The skin is coarse and dry, the hair short and thin. First and second dentition are delayed. As far as palpation enables one to judge, the thyroid gland is subnormal in size. Pseudo-lipomata I have not found." He has tried the effect of thyroid extract with some benefit, but there is not the same remarkable change as in the cretins. I cannot altogether concur with Dr. Telford Smith's statement as to the slow, deliberate movements and mental apathy of Mongolian idiots. It was a form in which Dr. Kerlin, of Elwyn, was particularly interested, and with him I had many opportunities of seeing cases. They rather impressed me as vivacious, often very sprightly and mischievous. In no instance was there any condition of the subcutaneous tissues suggestive of myxœdema.

Deaf-mutism is a not infrequent accompaniment of sporadic cretinism. In the endemic form it is still more common.

The various forms of idiocy dependent upon faulty development of the hemispheres in foetal life, the hydrocephalic and the microcephalic

¹ British Medical Journal, 1896, ii. p. 621.

² Archives of Pediatrics, April, 1897.

idiots, and the forms of imbecility associated with the cerebral palsies of children are readily distinguished.

(c) *The condition known as fetal rickets*—achondroplasia or the chondrodystrophia fetalis—is liable to be mistaken for cretinism. On August 4, 1886, when at Cacouna in the Province of Quebec, I was asked to see two cretins, and found them remarkable rachitic dwarfs, belonging to this type. As instances of this condition which survive birth are rare, I will here give brief statements with reference to them, and illustrations.

The parents were healthy French Canadians. There were fourteen children in the family, the eldest twenty-seven, the youngest four. Five children had died in infancy. With the exception of the dwarfs, the children were all very healthy and well grown.

FIG. 9.



FIG. 10.



Wilhelmine C., aged sixteen years, height 86.5 cm. (34 inches). (Fig. 9.) The mother did not remember anything abnormal about her as a young infant. She walked when eighteen months old. The head seemed large, and the mother said that the fontanelle did not close until the sixth year. When between three and four it was noticed that she did not develop naturally, and that the joints were very large. She is bright looking and intelligent, but somewhat full and coarse-featured. The head measures 56 cm. The teeth are well formed. She talks fluently and well, and has learned to read a little, and is beginning to write, but she is backward for a girl of her age. The most remarkable phenomenon is the condition of the joints of the long bones. The shafts are short and look thin, and the articulations are very large and irregular. The shoulders are not much affected, but the elbow-joints, the wrist-joints, and the knees and ankles are enormously enlarged. She is a little knock-kneed when she stands. The mobility in the joints is perfect.

Alphonse C., aged eleven and a half years, height 87 cm. (33½ inches).

(Fig. 10.) The mother did not notice anything special about him except that he was late in walking, and the anterior fontanelle did not close until between the third and fourth years. He did not seem to grow much after the fourth year. He presents an identical picture to that of his sister. His head is large, but well formed. He is very intelligent looking and bright, and is good tempered. The articulations are extraordinarily large, and contrast with the smallness and shortness of the shafts of the bones. He is somewhat pigeon-breasted, and when he stands is knock-kneed.

The trunk and head in both these children look almost of natural size, but the shortness of the legs, and particularly the shortness of the shafts of the long bones, is very striking. The thyroid gland was not enlarged in either case. I recognized that the cases were not cretins, and labelled them as rachitic dwarfs, but it was some years later that I learned the true nature of the affection, namely, the chondrodystrophia foetalis.

The relation of this remarkable condition to cretinism is very carefully discussed by Kaufmann,¹ and more recently by Bircher,² to whose papers the reader is referred. John Thomson, in the *Edinburgh Medical Journal* for 1893, gives excellent illustrations of the adult form.³ The thyroid is not usually involved, though it has been found absent in a foetus which presented this condition (Bowlby).⁴ The intelligence is not specially disturbed, the facial and cranial characters are not those of cretinism, and myxedema is not present. The most characteristic feature is the dwarfing, with remarkable shortness of the limbs (micromelia), owing to disturbance of the growth of the shafts of the long bones, and with, in most cases, enormous enlargement of the articulations, due to a hyperplasia of the cartilaginous ends of the bones. Bircher concludes that the condition is quite independent of the state of the thyroid gland. He is in error, however, when he states that the cases of sporadic cretinism described by Cushing and Fagge belong to this group.

(d) And lastly, the condition of *infantilism* may be briefly spoken of as in some instances dependent upon disturbed function of the thyroid, and there may be a possibility of confounding the cases with slight grades of cretinism.

Infantilism is a "morphological syndrome characterized by the preservation in the adult of the exterior form of infancy with the non-appearance of the secondary sexual characters." Lamy, in an analysis of Meige's extensive article in *l'Anthropologie* for 1895, gives the fol-

¹ Untersuchungen die über sogenannte fetale Rachitis (Chondrodystrophia Foetalis). Berlin, 1892.

² Lubarsch und Ostertag, Ergebnisse, Abt. i., 1896.

³ They are reproduced in Gould and Pyle's "Anomalies," etc.

⁴ Pathological Society Transactions, 1884.

lowing description: "Face arrondie, joufflue, lèvres saillantes et charnues, nez peu développé, visage glabre, peau fine et de couleur claire, cheveux fins, sourcils et cils peu fournis. Torse allongé, cylindrique. Ventre un peu proéminent. Membres potelés, effilés de la racine aux extrémités. Une couche adipeuse d'une assez grande épaisseur enveloppant tout le corps et masquant les reliefs osseux et musculaires. Organes génitaux rudimentaires. Absence de poils au pubis et aux aisselles. Voix grêle et aiguë. Larynx peu saillant. Corps thyroïde généralement petit."

Occasionally the subjects of infantilism display opposite sexual characteristics—femininism not only in bodily conformations, but in mental attributes. Apart from hereditary syphilis, in which the condition is not uncommon,¹ infantilism seems rare in this country. It is occasionally seen combined with great obesity. More frequently it is an accompaniment of mental defects in imbeciles and idiots. The onset of puberty, with the development of the secondary sexual characters, is delayed for years after the normal age. The sporadic cretin often presents the characters of infantilism even when above thirty (see photograph of Dr. Sinkler's case), but there are rare instances of infantilism, properly so called, complicated with myxedematous features, due to loss of function of the thyroid, and such cases might be relieved by appropriate treatment.

IV. THE PATHOLOGY OF SPORADIC CRETINISM. There are three groups of cases, as noted by Dr. W. Rushton Parker:

(a) *With absence of the gland.* The gland has not developed in fetal life, or become completely wasted, so that at autopsy no trace of it is found. The child may be born a cretin, which is excessively rare. In a considerable number of the reports on sporadic cretinism the thyroid is stated to be absent, but it is almost impossible to judge by palpation if the gland is very small. In one of Hilton Fagge's cases the gland was thought to be absent, but post mortem there was a thyroid gland of some size, with tumor. Dr. Friend, of Milwaukee, has kindly sent me the full report of a case in which the autopsy showed the thyroid gland to be absent:

Hattie G., female, aged sixteen years and one month. Length of time thyroid tabloids given (Burroughs & Welcome) one year and ten months. During this time she grew from 76.5 cm. to 105 cm. Anterior fontanelle closed within six months after treatment was begun. At the end of seven months seventeen teeth of the second dentition appeared. Within the first two months the myxedema began to disappear, and within six months was lost, the hair of the head becoming of a finer grade and very thick at the same time. The mental condition improved considerably, and as manifested by the action of the special senses—

¹ See Fournier's excellent description in "Les Affections Parasyphilitiques," 1891.

namely, hearing, sight, taste, touch, and, in a slight degree, speech: the first by recognition of the voices of the nurses; the second by the attention given to the children at play in the wards and to pictures in books; the third by the refusal of certain foods and a preference for certain kinds; the fourth by a desire to grasp firm substances with the hands, so as to lift herself; the fifth by the formation and expression of two distinct words—*la*, *da*. With the augmented mental association, motor improvement was also observed. She began to sit up, and by grasping the back of a chair or a bedpost, she could also hold herself standing. These associations were indicated within one and a half years of treat-

FIG. 11.



ment. The tongue ceased protruding within six months after treatment was begun, and the salivary dribbling ceased immediately after the roots of the teeth of the first dentition were pulled and those of the second dentition appeared. The latter appeared within two weeks after the first were withdrawn. As is indicated by the photograph (Fig. 11), the loss of the protruding abdomen was distinct and progressive. The blood-count never rose higher than 3,500,000 red corpuscles, and only a relative increase of lymphocytes. The urine showed no changes worthy of special note. The treatment was continued almost to the date of her death.

In reference to her death, Dr. Friend writes:

“The only cause of death manifested was two drachms of bloody fluid in the lateral and fourth ventricles of the brain. I could not discover from where the blood came, although I examined all the blood-

vessels carefully in the lateral ventricles and about the fourth. They were probably capillary diapedesis. I found all of the veins surcharged with blood, and the dura, extending about one-half inch on both sides of the longitudinal sinus, was of a deep red color. From the symptoms, especially indicated by the sudden onset of fever, I am inclined to think that the ptomaines in the extract of the gland may have produced a poisoning. This is, however, difficult to demonstrate. All other organs showed a negative condition. The thyroid gland was absent. The thymus was very large and weighed 64 grammes. The pituitary gland was very small and weighed 0.2 grammes. Microscopically all organs showed an excess of connective tissue. In the posterior wall of the bladder I found imbedded a concretion about the size of a dime."

In reply to a question about details as to the presence or absence of the thyroid gland, Dr. Friend writes that a most careful dissection was made, and there was not even a trace of fibrous tissue as indicating the locality of the gland.

Curling first described the absence of the thyroid in cretinism in the two cases which he reported in 1850.¹

Bramwell,² in a review of the literature in 1892, found ten autopsies, of which, in nine cases in which the condition was noted, the gland was absent. Fletcher Beach states that of 116 cases collected from the literature, there were sixteen autopsies, in fourteen of which the gland was absent, while in two goitre existed.

(b) *With atrophy of the gland.* This is a very important group, to which Fagge appears to have been the first to call attention. He gives the case of "a girl, who was stated by her relations to have been perfectly healthy until she was eight years old, when she fell ill with what was supposed to be a second attack of measles, and kept her bed for a fortnight. After her recovery her physical development underwent a remarkable change. Her features were previously well formed; they now acquired the cretinous configuration. Her hair, once black and abundant, became light colored, dry, crisp, and very scanty. She ceased to grow; at the age of sixteen and three-quarter years she was only four feet one inch in height."³ He suggests that the febrile illness led to atrophy of the organ, and that this was the cause of the supervention of the cretinous state. In Case II, in my first series, the condition seemed to follow an attack of enteritis. Ashby and Wright⁴ give the history of a case said to have been well until an attack of enteric fever at seven years of age.⁵

It is interesting to compare these cases with the remarkable instance of operative myxedema reported by Bruns to the Myxedema Committee

¹ Transactions of the Royal Medical and Chirurgical Society, 1850, vol. xxxiii.

² Atlas of Clinical Medicine, vol. 1.

³ Fagge, Practice of Medicine, vol. 1., p. 772.

⁴ Diseases of Children, second edition, p. 179.

⁵ In the British Medical Journal, May 29, 1897, Dr. Parker has collected ten cases of this kind, in which atrophy of the gland occurred in early childhood, either spontaneously or following some fever. The clinical condition is spoken of as juvenile myxedema.

of the Clinical Society.¹ The patient at the time of operation was ten years old. Eighteen years after he had become "a dwarfy cretin." He had not grown since the removal of the thyroid, the expression was that of an idiot, there was characteristic myxedema, with a mental apathy amounting almost to imbecility.

The determination of the atrophy of the gland during life is very uncertain, as pointed out by Fagge. No trace of the gland may be felt, and yet post mortem a well-marked, perhaps somewhat wasted, organ is found. In the recorded autopsies in sporadic cretinism atrophy has not, so far as I can gather, been hitherto found.

Through the kindness of the officers of the Indiana School for Feeble-minded Children at Fort Wayne, I am enabled to report upon a fatal case in which there was extreme atrophy of the gland. The patient, Louise S. (Case VI. of the series), aged fourteen years, born in America, parents not related; no goitre in the family; nationality German. Height 110.5 cm.; circumference of head, 56 cm.; from occiput to root of nose, 33 cm.; from external meatus to external meatus, 26.7 cm.; circumference of neck 28 cm. The skin is loose and flabby, elastic and soft, very abundant. She is a deaf-mute, but appears intelligent. There is no curvature. The thorax is 57.3 cm.; abdomen 68.6 cm. The limbs seem a little enlarged about the epiphyses. There is no goitre. Dr. Delia Howe has sent a subsequent note that she had no treatment until September, 1895. She was then given the thyroid extract, three grains three times a day. She improved in many respects. The protruding abdomen disappeared, and she became very much brighter mentally. She became ill in March, and died of acute tuberculosis in November, 1896. At the time of her death she was seventeen years old, and her height was 127 cm. The thyroid gland weighed 4 grammes. The normal weight of the organ is from 15 to 20 grammes.

I am indebted to Dr. Barker, the Associate Professor of Anatomy in Johns Hopkins University, for a careful description of the condition of the gland, which is of special value, since, so far as I can learn, there has been no histological description of the thyroid in sporadic cretinism. The following is an abstract of his report, which will appear in full in the paper in the *Transactions* of the Congress. To the naked eye there was a very marked increase in the connective tissue separating the lobules, and with low power the acini were seen to be separated from one another. The individual acini were almost solid, except here and there, there were single cyst-like dilatations filled with colloid. High powers showed the most marked atrophy of the gland and certain remarkable transformations in the epithelium. A majority of the acini in the individual lobules possess very narrow lumina, which are often encroached

¹ Clinical Society Transactions, supplement to vol. xxi.

upon by papillary projections, or partially filled with proliferated and desquamated cells. Cells lining the acini are so much altered that not knowing the specimen one would not recognize them as of the thyroid. The cell bodies vary a great deal in size, from small cells equal in dimension to those of the normal thyroid, to large flat structures, actual giant cells. The nuclei of the cells show marked alterations, many of them being huge, bladder-like nuclei. In some nuclei the chromatin is disposed peripherally.

The lumina of the acini vary much in size; some of the alveoli possess no lumina at all. In others only a very small central opening is to be seen. Extremely few contain any colloid. A majority are either entirely empty or show inside them only desquamated cells from the alveolar walls. A few cysts from three to six times the size of the normal alveoli are present, lined by flattened thyroid epithelium. Some of them have evidently been formed by the fusion of several acini. The colloid varies in its behavior to Van Gieson's stain. In some of the few cysts present it is of a bright yellow tint; in others it stains of a reddish-brown, and is then more refractive. In the connective tissue one or two spaces filled with refractive colloid were found. These probably represent lymph vessels, but there is no great amount of colloid inside the lymph spaces, nor is any colloid to be seen within the blood-vessels. Dr. Barker remarks that the findings in this case are in the main confirmatory of those which have previously been made in endemic cretins. The condition is very similar to that which has been reported by De Coulon in the endemic cretinism.¹

(c) *Sporadic cretinism with goitre.* Of the sixty cases collected in this country, seven had goitre. Herein lies a very striking difference between the sporadic and the endemic cretinism. In the latter the percentage of goitre in some statistics has been as high as 60 (Knapp). In Fletcher Beach's collected statistics of 116 sporadic cretins in different countries the thyroid is noted as "not felt" in 73; "felt" in 11, and enlarged in 7 cases. He states that of sixteen post-mortems of which he has been able to find an account the thyroid gland was absent in fourteen cases, and there was bronchocele in two.

Through the kindness of Dr. Darcy, of Northwood, Iowa, and of Dr. Kessel, of Cresco, Iowa, I am enabled to report upon and show the photograph of two remarkable goitrous cretins.² The father's sister had goitre. There were five children; one died at the age of eight months of diphtheria; one is alive and well, and has no goitre, and three have had goitre, one died at the age of eight years following

¹ Virchow's Archiv, February, 1897.

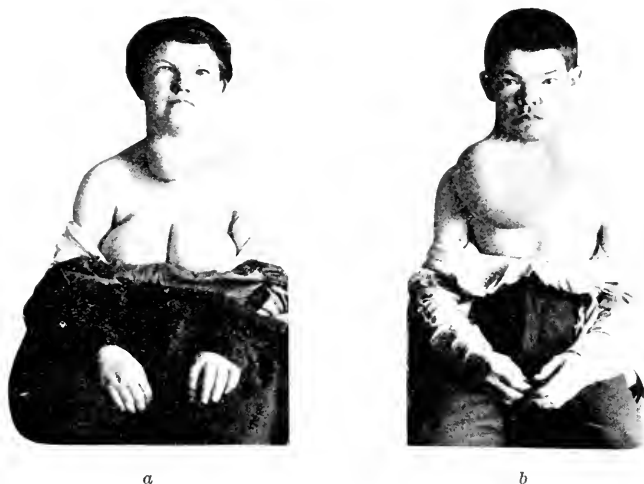
² They remind one of Shakespeare's description in the "Tempest" of the
"Mountaineers

Dew-lapp'd like bulls, whose throats had hanging at 'em
Wallets of flesh."

an operation on the goitre. In the two whose photographs are given here the goitres made their appearance when they were quite young infants. The notes of the cases as given by Dr. Kessel are as follows:

Elizabeth L., female, aged twenty-seven years; height four feet seven inches; weight 100 pounds. Talks but little, but is smiling, and in much better spirits than the boy. Head large. Strabismus. Health apparently good. Hears watch only on contact with both ears. Complains of much tinnitus in left ear. Appetite good; sleeps well. Thyroid tumor lobular (three lobes) and hard. (Fig. 12*a*.)

FIG. 12.



Robert L., male, aged twenty-nine years; height five feet; weight 105 pounds. Head is small, and almost no intelligence. Complains of difficult breathing, especially on going up a hill or up stairs. Has to lean forward when sitting. Is very hoarse; talks but little, and keeps his chair most of the time. Appetite not good at present. Hears watch on contact only with left ear; at three inches with right ear. Is quite anæmic. Thyroid tumor cystic in large lobe; harder in the smaller lobes. (Fig. 12*b*.)

V. THE RELATIONS OF SPORADIC TO ENDEMIC CRETINISM. When the "cretinoid state," to use Gull's expression, whether developing spontaneously or following thyroidectomy, became recognized as a direct result of the loss of the function of the thyroid gland, it was a simple matter to suggest that true cretinism, both sporadic and endemic, had the same origin. The generic term cretinism may indeed be used to cover these four allied states—endemic, sporadic, idiopathic of adults (myxœdema), and operative—following total excision of the gland. One and the same pathological basis exists in the entire group—viz., loss or perversion of the function of the thyroid; the anatomical basis

is varied—total absence, atrophy or goitre. Kocher,¹ in his masterly presentation of the subject, takes this wide ground. Without exception, so far as I know, recent writers have assumed this position, but quite recently this relationship has been questioned by Bircher, a well-known student of endemic cretinism, in an excellent section on the "Thyroid Gland," in Vol. I. of Lubarsch and Ostertag's *Ergebnisse*, etc., 1896. He concludes "that the cretinoid degeneration is in no way connected with disturbance in the function of the thyroid gland." He bases this opinion upon the persistence of the thyroid, cystic, and degenerated, it is true, in a large proportion of cases. In twenty cases fifteen had goitre, four normal thyroid glands, and in one only it could not be felt. In three cases in which he had extirpated the thyroid in cretins and in the non-degenerated parts he had found normal thyroid tissue. Moreover, a cretin from whom he removed the cystic goitre became myxœdematous, and was temporarily cured by the implanting of a gland; but, as Hanau and Ewald both remark, this is no evidence that the thyroid has nothing to do with cretinism. It would be very much the same as the development of uremia in a case of chronic nephritis after bilateral nephrotomy.

Both Curling and Fagge believed the conditions which they described to be identical with endemic cretinism. They further have the great merit of recognizing the loss of function of the thyroid as the probable essential factor in the diseases. Curling's title is in itself suggestive: "Two cases of absence of the thyroid body, and symmetrical swellings of the fat tissue of the neck, connected with defective cerebral development." In seeking an explanation he speaks of "the absence of those changes which result from the action of the thyroid, or on some imperfection in the assimilating processes consequent on the want of this gland; and the facts here detailed may not be without significance in directing the researches of future inquirers into the use of this body." Fagge held that the presence of the thyroid gland was "protective against the occurrence of cretinism." A similar opinion had been expressed about endemic cretinism in 1830 by Troxler (Kocher).

We may ask in the first place, are there any essential differences between the sporadic and endemic forms of cretinism? A single definition covers both conditions—*a chronic affection characterized by disturbance of the growth of the skeleton and soft parts, a remarkable retardation of development, an extraordinary disproportion between the different parts of the body, a retention of the infantile state, with a corresponding lack of mental progress.* One has only to compare the picture given of cretin in Switzerland with those of the sporadic form both in England and

¹ Zur Verhütung des Cretinismus und cretinoid Zustände nach neuen Forschungen. Zeitschrift f. Chirurgie, Bd. XLIV., 1892.

this country, to see that the two states, so far as external characters go, are identical. The differences between the two forms are as follows:

1. The endemic variety develops under local conditions as yet unknown, associated with a peculiar poison of doubtful nature. Bircher states that "the cretinoid degeneration is a chronic infectious disease, the organic miasm of which is associated with certain marine deposits of the earth's surface, and which gains access to the body through the drinking water." It is only of late years that any light has been thrown upon the intimate relation of goitre and cretinism. I have already referred to the opinions of Troxler, Curling, and Fagge, and almost all writers on the endemic form agree with the statement of Morel, that goitre is the first step on the road leading to cretinism. It is possible, however, that changes other than those which lead to goitre may be effective; anything which causes loss of function of the gland.

2. The differences in the changes in the bony skeleton. In the endemic cretin a premature ossification of the spheno-basilar bone has been described, and the fontanelles close early. How far these are constant characters remains to be demonstrated. In the sporadic form the fontanelles often remain open for a long period, even until after the tenth year, and there is a greater retardation in the development of the long bones.

3. The endemic cretin is said not to show the same myxœdematous characters as the sporadic cretin, but the accounts vary in different authors; and the description of the cutaneous condition given by Kocher (whose experience with cretinism has been very large) fits that of the sporadic cretin exactly. Other minor differences are mentioned, such as the shorter life of the sporadic cretin; Ewald,¹ indeed, states that he knows of no instance in which life has been prolonged beyond the thirtieth year, but of the cases which we have collected there were seven beyond the thirtieth year. Another point is the less frequent presence of goitre. The percentage of goitre in endemic cretins has been noted as high as sixty; in the Sardinian Commission there were 3912 instances of goitre in 5923 cases. In the collected series of sixty cases there were only seven with goitre. The two cases with goitre figured on page 397 are good examples of goitrous cretins occurring in a family in which goitre was prevalent.

4. Bircher states that the thyroid extract has no influence upon endemic cretins, a fact which he claims illustrates the independence of loss of thyroid function; but I cannot gather that he, or, indeed, anybody else, has systematically tried the thyroid treatment upon young cases. There is some positive evidence. Kraepelin² (who holds that in

¹ Nothnagel's *Specielle Pathologie und Therapie*, Bd. xxii., the most recent account of cretinism and allied states.

² *Psychiatrie*, fifth edition, 1896.

endemic cretinism disease of the thyroid is the first link in the chain, and that changes in the skin, retardation of growth, and dementia result directly from loss of function of the thyroid) speaks most hopefully of arresting the disease by thyroid feeding if begun early. He adds that even in long-standing cases it has been possible by the thyroidin to wholly reduce the swelling of the skin, and he has seen the menstrual function restored. The psychical features were not much improved.

Prof. Gaule, of Zurich, writes me that he is informed by Kocher that all the cases that are brought to the hospital are treated with the thyroid extract.

Professor Sahli, of Bern, writes that "so far as I know, the observations on operative myxoedema have been confirmed by the thyroid treatment of young cretins." The question is one deserving of the most careful study in the goitre and cretin districts of Europe.

The minor differences between endemic and sporadic cretinism, many of which are still doubtful, cannot for a moment be set against the similarity of the two conditions in almost all points save the local (telluric) influences in the causation of the former; and there only remains the question of the state of the thyroid gland. It is remarkable that in endemic cretinism the observations should be so scanty. Hanau¹ reports three cases, in all of which the thyroid glands showed alterations, being smaller, and in one there was a cyst. The connective tissue was abundant, the alveoli smaller, and in only a few was there the normal colloid. Langhaus,² in one case, found the gland enlarged, and made up of large alveoli, many of which were empty and only a few filled with refractive colloid. De Coulon,³ working in Bern, has examined the thyroid gland in four cretins, and in one cretin of bodily form, but good mental development, and after a most thorough histological study, concludes "that the thyroid had not completely degenerated, but the tissue showed changes which indicated that its function was impaired, or at least reduced to a very low ebb. The smallness of the alveoli, their disappearance in consequence of the relative increase in the connective tissue, the absence of colloid in the majority of the alveoli, and in almost all the lymph vessels, so also the condition of the epithelium and the nuclei . . . speak in favor of this view." Also the condition of the existing colloid and its reactions suggested, he thought, important chemical changes of a degenerative character.

In the atrophied gland of Case VI, the lesions were identical with those found in one of de Coulon's cases, which still further strengthens the position of those who hold the essential unity of the process. In

¹ Transactions of the Berlin International Congress.

² Virchow's Archiv, Bd. cxxviii.

³ Ibid., Bd. cxlvii, 1897.

neither form is the state of the thyroid gland always the same; loss or serious perversion of function is the important factor, and this may follow absence, atrophy, or hypertrophy. There is no fixed stamp or type of cretin; the range is from a mere mass of humanity without a ray of intelligence, to the high-grade cretin with but slight bodily and still slighter mental changes; and it is only reasonable to believe that to these grades are correlated varying degrees of thyroid degeneration. Bircher lays great stress upon the presence of normal-looking tissue in the glands which he excised from cretins, but gives no statement of any histological study; nor is the development of myxedema in one of these cases, and of tetany in another, inconsistent with the view that the thyroid is the seat of the essential lesion, since the activity of the gland may have been sufficient only to maintain the organism at a certain plane of cretinoid existence.

If the experimental work on the importance of the para-thyroids should be confirmed, the whole question will have to be reviewed from this standpoint.

There are, of course, gaps in our knowledge, but the evidence at present available warrants, I believe, the conclusion that the changes characteristic of cretinism, endemic as well as sporadic, result from *loss of function of the thyroid gland*.

THE INFLAMMATIONS OF THE COLON AND THEIR TREATMENT.

BY FRANCIS DELAFIELD, M.D.,
OF NEW YORK.

THE descriptions of dysentery to be found in books, and the ideas concerning dysentery which exist in the minds of physicians, are derived largely from the consideration of four sets of cases: the severe and often fatal dysentery of tropical countries, the dysentery which has always accompanied armies, the mild catarrhal dysentery of temperate climates, and the more recently described amœbic dysentery.

For those of us who live and practise in temperate climates something more is required. There are a number of points concerning which we need the teachings of local experience. The causation, lesions, prognosis, and treatment of inflammations of the colon as they occur in ordinary practice in temperate climates have not as yet been studied in sufficient detail.

This paper is an attempt to describe the different forms of colitis which are to be seen in the city of New York and its suburbs.

In New York, while the disease is not at most times very prevalent,

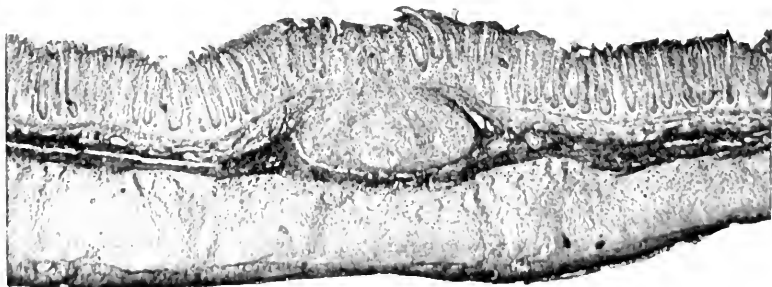
yet the variety of cases is considerable, so that in the course of years one may see a number of cases of inflammation of the colon which differ widely from each other.

1. The most common of all the forms of colitis, and the one with which every physician is familiar, is that in which there are no structural changes in the wall of the colon, nothing but congestion, an increased production of mucus, and an exudation of serum. It is usually called acute catarrhal colitis or acute catarrhal dysentery.

For practical purposes it is necessary to divide this class of cases into two varieties: one characterized by the increased production of mucus, the other by the increased exudation of serum.

1. *Colitis with an increased production of mucus.* As this form of colitis is rarely fatal in adults, our knowledge of the lesions is derived from it as it occurs in children, as it is associated with other forms of colitis, as it is produced experimentally in animals, and from the character of the discharges from the bowels during life. The inflammation begins regularly in the rectum, and either remains confined to this part of the colon or extends upward. But in children a large part of the colon and the lower end of the ileum may be inflamed from the first. The glandular and connective tissue coats are more or less swollen and congested and infiltrated with serum and a few leucocytes. There is an increased production of mucus, which coats the inner surface of the colon and is passed by the patient. There is often a moderate bleeding from the surface of the inflamed mucous membrane. The epithelial cells which line the glandular tubules are distended with mucus; the superficial cells desquamate and are mixed with the mucus. The solitary lymph-nodes in the walls of the intestine are often swollen. (Fig. 1.)

FIG. 1.



Acute catarrhal colitis. Increased production of mucus. Desquamation of epithelium. Swelling of lymph-node.

In children there may also be an infiltration of the glandular coat, with pus-cells and necrosis of the swollen lymph-nodes, with the formation of little ulcers.

It must be admitted that, although this form of colitis is of frequent occurrence, our knowledge of its causation is not very definite. A variety of bacteria have been found in the passages, but no one of them can be considered as a certain cause of the inflammation. As probable causes may be enumerated impure water and milk, unripe or decayed fruits and vegetables, crowded rooms, and hot weather.

If the inflammation is confined to the lower end of the colon, it regularly runs its course within a week, and the patient recovers. The principal symptoms are the local ones: pain in the rectum, an irritability of its mucous membrane, which makes it try to discharge everything in contact with it, and the frequent passage of small quantities of blood and mucus. But little fecal matter is discharged. In addition there is a moderate rise of temperature, with more or less prostration. Some of the patients do not go to bed, some do not even stop work.

If, however, the inflammation not only involves the rectum, but extends up into the colon, the patients are more seriously ill, especially if they are young children. The quantity of mucus discharged from the bowels is considerable, and very little fecal matter is passed for one or two weeks. As the inflammation subsides the quantity of mucus decreases and that of fecal matter increases. In these patients the temperature is higher, the duration of the disease longer, and the prostration greater. Adults regularly recover, but children often die.

The ordinary method of treating these patients is by rest in bed, a fluid diet, castor oil or sulphate of magnesia to empty the colon of fecal matter, and combinations of bismuth and opium.

Another satisfactory plan is to irrigate the rectum every day with from one to two quarts of an infusion of flaxseed, and give no medicine.

Such an acute colitis is sometimes followed by a chronic colitis, which may continue for years. Such a chronic colitis regularly follows one of two types.

(a) The chronic inflammation is confined to the rectum, and is attended with a gradual thickening of the glandular, connective, and muscular coats. The patients have frequent small passages of mucus and blood. They lose flesh and strength as long as the colitis continues. The most efficient treatment is by local applications to the rectum and residence in a dry inland climate. But the natural tendency of the inflammation is to continue, and many of the patients do not get well.

(b) The chronic inflammation may involve any part of the colon or its whole length. There are no anatomical changes in the wall of the colon. The feces are sometimes formed, sometimes fluid. Mucus is passed in varying quantities and at varying intervals. According to the position of the inflammation in the colon the mucus is discharged before the feces, with the feces, or after the feces. The patients suffer from more or less abdominal pain and loss of nutrition. Many of them

become hypochondriacs. Treatment is often difficult, and it is well to remember that the general health of the patient is of more consequence than the quantity of mucus which he discharges from the bowels. This condition must not be confounded with the so-called "membranous enteritis."

2. *Acute colitis with a large exudation of serum.* These cases are not to be confounded with the cases which I have described elsewhere under the name of "morning diarrhoea." The condition is an inflammatory one, and not a functional disturbance of the intestine.

The disease is not a fatal one, and I have never had the opportunity of seeing the colon of one of these patients. The character of the symptoms is such as to make one believe that the inflammation involves the upper part of the colon, and that the exudation of serum into the cavity of the gut is the principal feature of the morbid process.

This form of colitis is especially common when, during the summer, there is a week of continuous hot weather. Cases are seen, however, at all times of the year. How far water or milk or food may be responsible for an attack it is difficult to say. In some persons there is a well-marked predisposition to this form of colitis, so that they suffer from attacks summer after summer.

The patients have at first a feeling of discomfort in the abdomen or colicky pains, a moderate amount of prostration, and sometimes nausea. Then there is the feeling of the necessity for emptying the bowels. The patients go to the water-closet, sit down, the sphincter opens, and a large quantity of fluid runs out without any effort of expulsion. The fluid consists of fluid feces, serum, and mucus. The quantity of each discharge is considerable, sometimes as much as two quarts.

There are a number of such discharges during each twenty-four hours. The patients are not always confined to bed, but they are weak and miserable. As a rule, there is no febrile movement. Such an attack may only last for a few days, or it may continue for weeks or months.

TREATMENT. A large number of the cases get well under a variety of treatments or even without any medication at all: but, on the other hand, there is a considerable number of cases in which the disease continues in spite of treatment. Every year I see several patients in whom the colitis has continued for months in spite of treatment by diet, opium, bismuth, and the intestinal antiseptics. The best plan for the management of these patients is this: A milk-diet except for one solid meal a day, one-fourth of a grain of codeia after each movement of the bowels, and five minims of castor oil with five grains of salol, to be taken together four times a day.

II. There is a form of colitis of which the most marked anatomical feature is the infiltration of the connective tissue coat of the colon with

pus-cells. (Fig. 2.) This infiltration is a large one, so that the wall of the colon is irregularly thickened. The glandular coat is also infiltrated

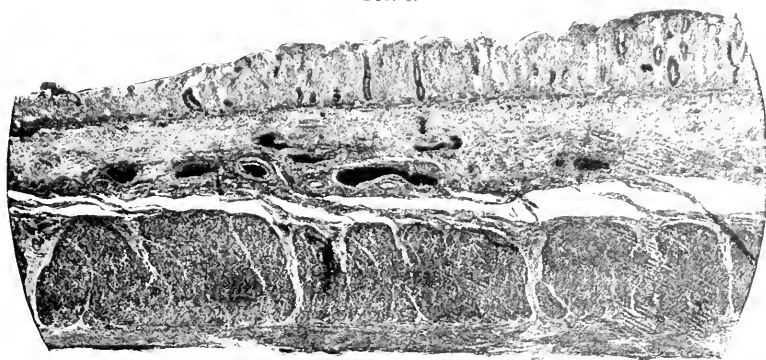
FIG. 2.



Purulent colitis. Infiltration of the connective-tissue coat with pus-cells.

with pus, but to a much less extent. I have only seen a few cases of this form of colitis, so that I cannot give a complete account of it. The inflammation involves the upper rather than the lower part of the

FIG. 3.



Productive and necrotic colitis. Growth of connective-tissue cells in the glandular coat, with destruction of the tubules.

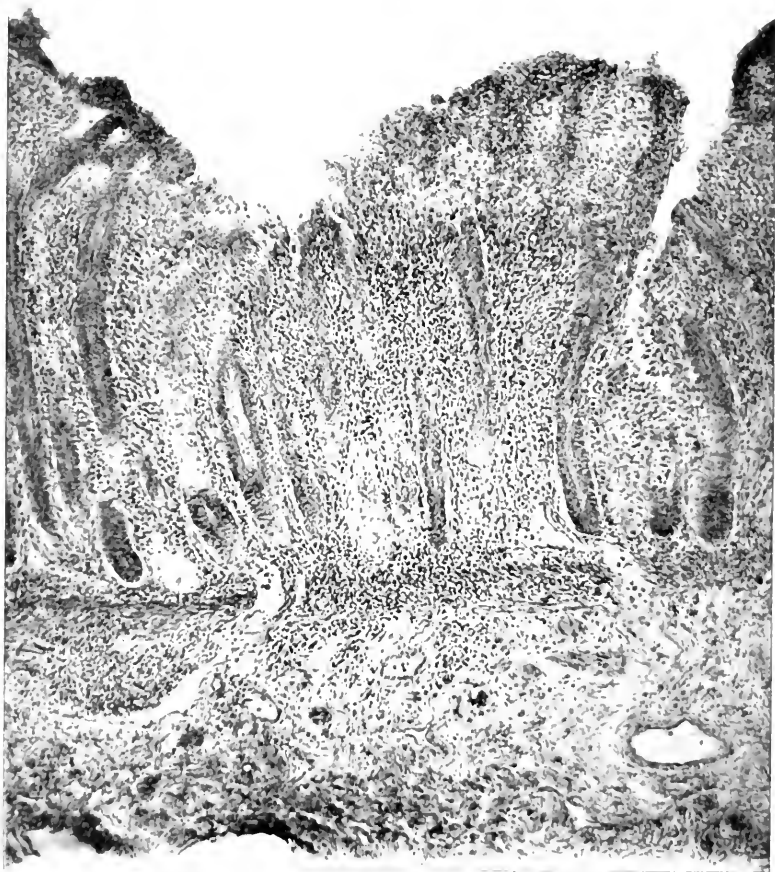
colon. The passages are diarrhoeal and not dysenteric. The patients look as if they were suffering from septic poisoning. The disease may

prove fatal within a few days or may continue for so long as a year. Treatment is altogether unsatisfactory.

III. There is a form of colitis to which I wish to call especial attention, because it is one of the most important forms of the disease that we have to deal with in New York. (Fig. 3.)

The anatomical characters of this form of colitis are: an increased production of mucus, an exudation of serum, an emigration of white blood-cells, a growth of new connective tissue in the glandular coat and the connective tissue coat, and small areas of necrosis of the glandular coat.

FIG. 4.



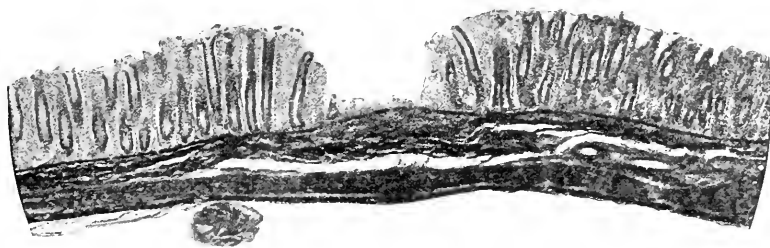
Productive and necrotic colitis. Infiltration of the glandular coat with pus-cells.

The inflammation prefers the upper part of the colon, but it may involve its entire length or be confined to its lower third. (Fig. 4.)

The gross appearance of the colon is that of congestion of the mucous

membrane, with perhaps a coating of mucus—the ordinary appearance of an acute catarrhal inflammation; but if we look more closely we see that in addition there are numerous small, superficial ulcers, many of them so small that they cannot be seen with the naked eye. In the old and severe cases, however, instead of these small ulcers we find a destruction of large areas of the glandular coat. (Fig. 5.)

FIG. 5.



Productive and necrotic colitis. Circumscribed necrosis of the glandular coat, forming very small ulcers.

The morbid changes belong to the glandular coat, but may extend to the superficial layers of the connective-tissue coat. The destruction of the glandular coat is effected by simple necrosis or by an infiltration with pus-cells. The ulcers do not have overhanging edges. Between the ulcers some of the tubules show necrosis of their epithelium, while some are obliterated by the growth of cells between them. The tissue between the tubules is thickened by a growth of connective-tissue cells, or by an infiltration with pus-cells, or by both. There may also be a moderate infiltration of the superficial layers of the connective-tissue coat with pus-cells and connective-tissue cells.

I have never been able to make out the causation of this form of colitis. It is not infrequent in New York. It is seen both in hospital and private practice. It occurs at all seasons of the year. Whether it is caused by impure water or milk or food I do not know. The feces show the usual variety of micro-organisms, but the general features of the disease are those of a streptococcus infection.

The invasion of the disease is sudden or gradual. If it is sudden, the patients are attacked with vomiting, frequent passages, abdominal pain, prostration, and a rise of temperature. The first passages are diarrhoeal—large or small—and composed of fecal matter, serum, and mucus; or dysenteric—small, painful, and composed of mucus and blood. The dysenteric passages do not continue; they belong to the first days of the disease. The prostration is considerable; the patients look sicker than they do with an ordinary catarrhal colitis. Sometimes there is even a sort of shock given by the invasion of the disease; the patients may have attacks of syncope.

If the invasion is gradual, the patients begin with what seems to be an ordinary diarrhoea—three to five loose fecal movements a day, with more or less colicky pain or constant abdominal pain. There is at first no rise of temperature. The patients gradually lose flesh and strength, but it may be several weeks before they go to bed. And yet it is a matter of much importance that the character of the colitis should be recognized and the patients put to bed during this early stage of the disease.

As the disease goes on the passages continue to be frequent and of considerable size. They are composed of fluid feces, serum, mucus, and often blood. The mucus is present in considerable quantities; it is diffuse or in the form of nodules. If the patients improve, the fecal matter increases in quantity and becomes more consistent, while the quantity of serum, mucus, and blood diminishes. The abdominal pain, whether colicky or constant, continues. There is no appetite. In some cases nausea and vomiting are very troublesome symptoms. There is usually a rise of temperature in the afternoon, even in the chronic cases. The patients steadily lose flesh and strength. Of the cases which recover some run their course within four weeks and recover entirely, and yet while the disease is going on the patients are sick enough to cause much anxiety. But there is a considerable proportion of cases in which the disease continues for months before the patients get entirely well. And, finally, there are patients who are under observation for years who often seem almost well, but yet always relapse.

In the fatal cases I have seen the disease proved fatal in seven days, but that was in a person already exhausted by privation and exposure. The rule is that the disease continues for a number of months before the patients die. Occasionally we see such a colitis in its early stages in persons who die from pneumonia. The prognosis is serious. A moderate number die from the disease, and in a very considerable number the disease is protracted for months.

The most important time for the treatment of this form of colitis is during the early stages of the disease. It is in the patients who are neglected at first that we see the protracted forms of the disease.

No matter how mild the invasion of the disease is the patients should at once be put to bed and on a diet composed principally of milk, and this management must be kept up until all evidences of acute inflammation have disappeared.

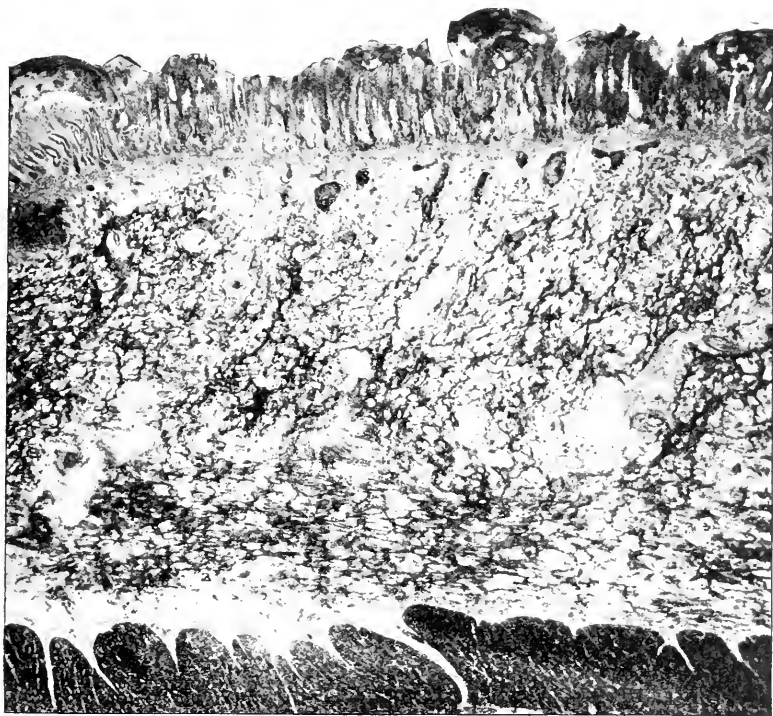
In the chronic cases, on the other hand, it is important that the patients should get out of doors and eat a sufficient quantity and variety of food. As a rule, these patients do best in a dry, elevated, inland climate.

During the earlier stages of the disease irrigations of the rectum are

of service, and even in the chronic cases such irrigations may be used with advantage from time to time.

As regards medication, it has seemed to me that I have obtained the best results, both in the acute and chronic cases, by the use of combinations of opium, salol, and castor oil; but I must admit that these remedies sometimes fail, and that I see patients recover under other plans of treatment. In the chronic cases the patients are apt to take in the course of the disease a considerable number of drugs. For example, a patient who was sick for eleven months, and was successively under the

FIG. 6.



Croupous colitis. Commencing necrosis of the glandular coat, infiltration of the connective tissue coat with fibrin.

care of four different physicians, received the following drugs: Salol, castor oil, tincture of opium, dilute sulphuric acid, Bland's pills, sulphate of morphine, subnitrate of bismuth, sulphate of strychnine, subcarbonate of bismuth, salicylic acid, nitrate of silver, resin of turpentine, salicylate of bismuth, naphthaline, sulphate of quinine, ichthyol, sulphide of calcium, liquor potassæ, codeia, acetate of lead and opium,

dilute nitric acid, carbonate of guaiacol, bone-marrow, Fowler's solution of arsenic, tincture of cubebs, tincture of hyoseyanus, phenacetin, acetanilid, biniodide of mercury, iodide of potassium. He also received enemata of starch and laudanum and of corrosive sublimate 1 : 10,000. The man went quietly on with from three to five passages a day, composed of fluid feces, mucus, and sometimes blood, with an afternoon temperature between 100° and 103° F., with progressive loss of flesh and strength. During the tenth month of his illness the afternoon temperatures became lower, and the man began to gain flesh and strength. After this the blood and mucus gradually disappeared from the passages, and finally at the end of the eleventh month he seemed to be well.

IV. There is a form of colitis characterized by the combination of an exudation from the bloodvessels, which forms fibrin, and of necrosis. This is commonly called croupous or diphtheritic dysentery.

The inflammation regularly begins in the rectum. It may remain confined to this part of the colon, or it may extend upward and involve the whole length of the colon and even the lower part of the small intestine. (Fig. 6.)

The irritants which cause the colitis seem to act, according to their virulence, upon the glandular coat alone, or upon the connective-tissue coat also, or upon the whole thickness of the wall of the colon. In the majority of cases the inflammatory changes are produced not uniformly, but in patches. (Fig. 7.)

In the milder cases, therefore, we find the inner surface of the colon studded here and there with little patches of false membrane. Vertical secretions of the wall of the colon at these points show a layer of fibrin and pus, necrosis of the superficial portions of the glandular coat, and a little infiltration of the glandular coat with fibrin and pus.

In the more severe cases the layer of fibrin on the inner surface of the colon is thicker, large infiltrations of fibrin are found in the connective-tissue coat, and even the muscular and peritoneal coats are involved in the exudation. The necrosis involves the whole thickness of the glandular coat, often extends into the connective-tissue coat, and may involve the whole thickness of the wall of the colon.

The dead tissue soon sloughs away and leaves ulcers of varying number, size, and depth.

In New York this form of colitis belongs to the autumn months. Not infrequently people bring it back to town with them from the country. In such people there may be a history of contaminated drinking-water. The behavior of the inflammation is that of one caused by the presence of pathogenic bacteria, and such bacteria can be demonstrated in the feces and in the wall of the colon. But it is not to be forgotten that identical anatomical changes are produced by

poisoning with corrosive sublimate, so that it is possible that such a colitis may be produced by other irritants than bacteritic toxins.

FIG. 7.



Croupous colitis. False membrane, necrosis of the glandular coat, infiltration of the connective-tissue coat with fibrin.

SYMPTOMS. The patients have numerous small, painful passages of blood and mucus. If the inflammation extends above the rectum, they also pass large quantities of brownish fluid. There is nearly constant rectal pain, irritability, and tenesmus. There may also be colicky pains and strangury. Many of the patients vomit, especially at the beginning of the disease. There is regularly a well-marked febrile movement throughout the disease, but in some of the bad cases the temperature is low throughout. In the severe cases the prostration is marked, the heart's action is rapid and feeble, delirium and stupor are developed. The disease lasts for from one to six weeks.

PROGNOSIS. The prognosis is serious on account of the severe character of the lesion, the general poisoning of the patient, and the permanent changes left in the wall of the intestine. If the whole length of

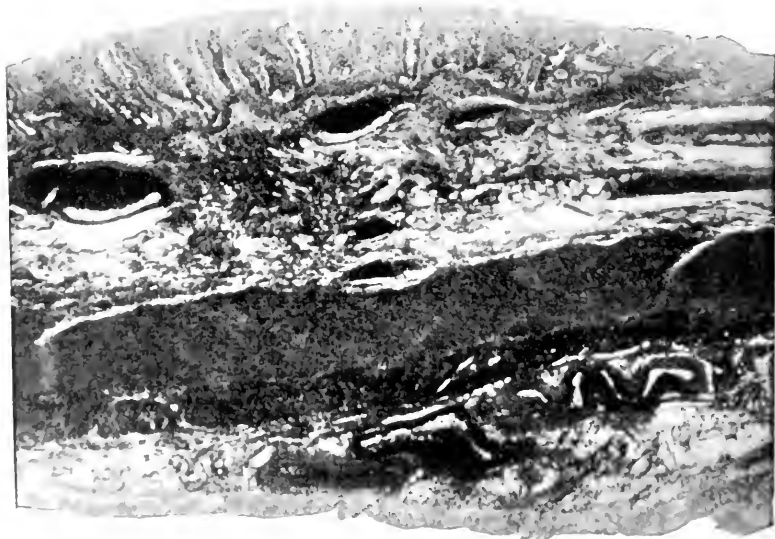
the colon is involved, the patients rarely get well. If the ulcers are large and deep, although the patient recovers from the inflammation, he is left with a colon so badly damaged that he is always an invalid.

All the patients are to be put to bed and kept on a fluid diet. Most of them require some preparation of opium to keep them comfortable. Many of them need alcoholic stimulants. It is important to distinguish whether the inflammation is confined to the rectum or whether it extends higher up. If it is confined to the rectum, it can be treated by irrigation alone; if it involves a larger part of the colon, drugs must be given in addition to the irrigation. Two quarts of an aqueous solution of corrosive sublimate, 1:10,000, have given me the best results as an irrigation. Ipecac, in 20-grain doses once or twice a day, seems to be the most efficient drug. I have also seen good results, however, from the early use of salol in 5-grain doses every hour.

V. There is a form of colitis in which the characteristic necrotic and inflammatory changes seem to be due to an infection with the *ameba coli*.

I have examined the colon in eleven fatal cases. In all but one the entire length of the colon was involved; in that one only the upper two-thirds.

FIG. 8.



Amoebic colitis. Diffuse necrosis of the glandular coat.

The main infection with the *amebae* is in the connective-tissue coat, and it is in this coat that the morbid changes begin. The *amebae* seem to cause swelling and necrosis, while other inflammatory changes may

be caused by an additional infection with streptococci or other bacteria. The exact method of the necrosis varies somewhat, and several different forms may be present in the same colon. (Fig. 8.)

FIG. 9.



Amebic colitis. Circumscribed necrosis and swelling of the connective-tissue coat.

(a) The necrosis may be confined to the glandular coat; there is swelling of the intertubular tissue and death of the tubules. In this way considerable portions of the glandular coat are destroyed and the connective tissue coat is laid bare. At the same time there is a growth of large and small cells in the connective-tissue coat. (Fig. 9.)

FIG. 10.



Amebic colitis. Ulcer formed by circumscribed necrosis of the connective-tissue coat.

(*b*) There are circumscribed thickenings of the connective-tissue coat, which soon become necrotic. In this way the glandular coat is undermined, and ulcers with overhanging edges are formed of varying size and depth.

(*c*) Large portions of the whole thickness of the wall of the colon are swollen and completely necrotic. The patients usually do not live long enough for these dead portions to slough away. (Fig. 10.)

In four of the cases there were amœbic abscesses in the liver. In one case there were amœbic abscesses in the lower lobe of the left lung. It is not easy to determine how persons become infected with amœbæ in New York, where the drinking-water all comes from the same source. Most of the patients had been living in the city for several years.

The invasion of the symptoms is either acute or gradual.

In the acute cases the patient is suddenly attacked with colicky pains and diarrhœa, often with nausea and vomiting and sometimes a rise of temperature. The stools are frequent, fluid, and sooner or later contain blood and mucus. The quantity of blood may be considerable. (Fig. 11.)

FIG. 11.



Amœbic colitis. Ulcer formed by circumscribed necrosis of the connective-tissue coat.

In the more gradual invasion there is at first nothing but a painless diarrhœa—several loose, fecal stools in the twenty-four hours.

The patients have no appetite; they lose flesh and strength and become anemic. In some of them the symptoms are continuous; in others there are remissions and exacerbations. Although the temperature may reach 101° F., the febrile movement is not a feature of the disease. The most noticeable symptoms are the frequent stools of fluid feces, bad-smelling fluid, mucus, and blood, the pains in the abdomen, and the progressive loss of flesh and strength. The disease may only continue for ten days or it may be protracted over several months. The same patient may have several attacks of the disease, even for a number of years.

A serious complication is the formation of the amœbic abscesses of the

liver, which may occur at any time in the course of the colitis, either in mild or severe cases.

Of less frequent occurrence are the amœbic abscesses in the lungs, with cough and bloody, foul-smelling expectoration.

I have seen one case in which the pulmonary symptoms preceded the diarrhœa by three days.

Perforation of the intestine followed by collapse or by peritonitis sometimes occurs. There may also be peritonitis without perforation.

I have seen one case, which lasted for six weeks, with temperatures up to 105° F., with the combined symptoms of a typhoid fever and a colitis. After death there were found the ordinary lesions of typhoid fever in the ileum and the mesenteric glands, and of amœbic colitis in the colon.

PROGNOSIS. The prognosis is serious, not only from the extent of the destruction of the wall of the colon, but from the liability to abscess of the liver, abscess of the lung, and peritonitis.

The indications are to use irrigations and drugs. The best irrigation is a solution of corrosive sublimate, 1 : 10,000. The most useful drugs are ipecac in large doses and castor oil in small doses.

VI. There is a form of necrotic colitis of which I have only seen a few examples. They were all hospital cases with imperfect histories and no account of the passages from the bowels. The history of one case will serve as a sample :

A woman, aged about fifty years, of intemperate habits, was brought into the hospital twenty-four hours before her death. It was said that for several months she had been losing flesh. For three days she had been vomiting coffee-ground matter. Nothing was learned concerning the passages from the bowels. She was in the moribund condition when brought into the hospital, with a temperature of 96° F., pulse of 160, and still vomiting coffee-ground matter.

At the autopsy there were found general bronchitis, small abscesses in the kidneys, cirrhosis of the liver, a normal stomach and small intestine. The colon, for a distance of three feet down from the ileo-cæcal valve, was in a condition of intense congestion. There were a number of small and large black thickenings of the glandular coat.

In the glandular coat there was some increase of mucus in the tubules and a little growth of cells between them. In the black thickenings the bloodvessels were distended with blood. The glandular and connective-tissue coats were infiltrated with pus-cells. The glandular coat was necrotic. The circumscribed character of these areas of extreme congestion and purulent infiltration would suggest that they were caused by infectious emboli.

There are, then, five forms of colitis which come under observation in New York.

1. *Acute catarrhal colitis.* An inflammation attended with the production of increased quantities of mucus and serum, but without struc-

tural changes. Its natural disposition is to run a short course and terminate in recovery, and it is therefore treated successfully in a variety of ways. In children, however, the disease may be fatal, and in adults it may be followed by chronic colitis.

2. *Acute purulent colitis*. This is not a severe catarrhal inflammation, but is a purulent inflammation of the connective-tissue coat. This coat is thickly infiltrated with pus, while the changes in the glandular coat are secondary. The symptoms are largely those of septic poisoning, and the disease is regularly fatal.

3. *Acute productive and necrotic colitis*. An inflammation which involves principally the glandular coat. The main features are the necrosis and the growth of new tissue. To these correspond the septic symptoms and the disposition of the disease to continue. The symptoms may resemble those of catarrhal or of amœbic colitis. The favorable cases last as long as three or four weeks, the unfavorable cases last for months. A moderate number of the cases are fatal.

4. *Croupous or diphtheritic colitis*. An inflammation of distinctly infectious character, and one which is often fatal. It is an old and well-recognized form of colitis.

5. *Amœbic colitis*. The inflammation is caused by the infection of the connective-tissue coat of the colon with the amœba coli. The presence of this organism causes a variety of necrotic and inflammatory changes. It is this form of colitis which is so often associated with abscess of the liver.

As regards the treatment of these different forms of colitis, it seems to me that the first thing to determine is whether the inflammation is confined to the lower end of the colon or extends higher up; the second thing to determine is whether the inflammation is or is not accompanied by necrosis of portions of the wall of the colon.

If the inflammation is confined to the lower end of the colon, it can be treated by irrigation alone; if it is confined to the upper two-thirds of the colon, it can be treated by drugs alone; if it involves the whole length of the colon, both drugs and irrigations are necessary.

An irrigation for an adult should consist of as much as two quarts of fluid, and the fluid must run in and out freely.

If the colitis is acute and without necrosis, the best fluid is an infusion of flaxseed; if it is a colitis with necrosis, solutions of corrosive sublimate, chloride of zinc, and formalin have given me the best results.

If the inflammation involves the upper part of the colon and is without necrosis, the preparations of opium and of bismuth are usually all that are necessary; but if it is a colitis with necrosis, ipecac in large doses, castor oil in small doses, nitrate of silver, salol, and naphthalin are the most useful drugs.

THE OPERATIVE TREATMENT OF IRREDUCIBLE
SUBCUTANEOUS FRACTURES.

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THE benefits accruing from modern methods of conducting an operation are so constantly in evidence that their discussion at this time seems trite. Yet it is only by keeping them in view that tentative suggestions in new fields can eventuate in things accomplished. Therefore only would I allude to the safety to life and limb with which compound fractures are now treated. A death following a compound fracture from wound infection is now a *rara avis*, even in hospital wards that are far from surgically clean. Barring the paramount danger of infection and its sequel, necrosis, there are factors which would render the prognosis as to restitution to the normal in compound fractures quite as good, if not better, than in those uncomplicated by a broken skin. The directness by which fragments can be moulded into position and retained by sutures, if need be, the ease with which intervening muscle or membrane can be removed, and the certainty with which an hæmatoma can be avoided at the site of injury, are data which, were it not for the danger of infection, would make the greater almost to be preferred to the lesser injury. So has the treatment of compound fractures been bettered by the grace of modern methods. In the absence of a like positive influence in the treatment of simple fractures, the results here obtained, on the whole, are much as they were during the three decades intervening between the introduction of anaesthesia and antiseptic surgery. Except in fractures of the simplest varieties, we share with our predecessors the anxieties from incomplete reduction, deformity, shortening, and of partial or complete ankylosis in articular and pararticular fractures. In regard to these as a class, indeed, only two steps in advance have been taken, and one of these is in the nature of a don't. There is an unanimity of opinion that by prolonged immobilization joint-function is jeopardized. To effect the best functional use of a joint "there must be a proper balance between rest and motion; rest of the broken bone, motion of the joint muscles, tendons, fascia. But even the methods to these ends are the subject of much controversy." This is one step. The other, a very decided advance, has been made in the method of overcoming shortening in exceptional cases by tenomyotomy. Its range of utility has been widespread since Dieffenbach first divided the triceps for fracture of the olecranon. Division of the tendo Achillis, the hamstring tendons, and of the sterno-cleido-mastoid may be done when it is evident that muscular contraction alone is responsible for the shortening or

deformity. In this connection it is amusing by way of contrast to quote from Ricard on *Fractures*. In 1890 he wrote: "It is useless to add that to-day no one has recourse to tenotomy; not on account of the terrible mortality which Malgaigne had forty years ago—three deaths in five cases—but because tenotomy has become superfluous since anesthesia and continuous extension are used in the overcoming of muscular contractions."

Cases are encountered in which anesthesia, extension, and tenotomy combined will fail to reduce deformity, and in which we seem helpless to prevent an unsatisfactory result. Aside from fractures of the patella and of the femoral neck, wherein anatomical data for bony union are deficient, we are wont at times to see results far from good in fracture of the lower end of the tibia, of the femoral shaft, of the lower epiphysis of the femur, of the radius, of the elbow, and of the clavicle. The use of the cathode ray, where feasible, will doubtless tend to lessen the frequency and extent of post-fracture deformities by making easier the apposition of fragments. Yet there will be cases in which a clear picture of the lines of fracture will avail but little or nothing in the therapy. The interposition of muscle, ligament, or fascia, or of a loose fragment of bone in the line of fracture will, at times, prevent its reduction and from the very beginning forbode a result dreaded in proportion to the deformity entailed and its ensuing limitations of motion. In view of the successes now almost uniformly achieved in elective operations on the bones and joints, the question might well be discussed, whether, in otherwise irreducible simple features, early operative intervention should be refrained from. Such has been the surgical teaching of the past.

Even very recent writers are silent upon the subject, and the consultant would find little or no justification in converting a recent subcutaneous fracture into an open one to obtain a permanent better result. Nevertheless, individual points have been made in this direction: by Senn, in the direct fixation of fragments in injuries of the hip, by McBurney in fractures of the humerus complicated by dislocation, and very recently by J. W. Hearn (reported by Spencer), in the suturing of the broken clavicle. An unique position in the immediate operative therapy of fractures is occupied by the patella, fractures of which have often enough been united to render a verdict against immediate interference. Since it was my privilege, in 1891, to see Schede overcome a four-inch shortening of the femur from oblique fracture six months after the injury, I have believed that in certain cases an interference before union had resulted would be preferable to the certainty of deformity. The cases in which operation would be indicated are necessarily few. Nevertheless, seven cases have come under my observation in

which the fracture was exposed and directly treated. I beg to submit brief histories of these cases:

CASE I. William F., aged twenty-four years, single, German; beer-wagon driver, admitted to the Good Samaritan Hospital May 1, 1892.

Diagnosis. Fracture of the lower end of the right tibia. In jumping to keep a brick wall from falling on him he landed full on his feet, but his right ankle turned, producing a fracture of the lower end of the tibia. The condition presented made the exact nature of the lesion difficult to determine. There was a very extensive hæmatoma about the ankle, very great widening of the joint, with crepitus easily felt. Under the extensor tendons below the line of the joint, surrounded by an hæmatoma, could be felt the loose fragment, which seemed to have the shape of the articular portion of the astragalus. Under anæsthesia every effort was made to bring this portion of bone into its normal relation between the tibia and fibula, but without success. A long anterior incision was, therefore, made over the joint and the loose piece of bone removed. It proved to be the outer portion of the tibia. It was pyramidal in shape, and the base was covered with cartilage. It measured an inch and a half in length and half an inch in thickness at its widest part, and evidently came from the articular end of the bone. Except for a small strip it was entirely detached. Through the incision the fracture of the lower end of the fibula was recognized. All clots having been removed, deep sutures were resorted to, the external wound partly filled with gauze, and retentive dressings applied. The first dressing remained in position ten days, and when it was removed showed the wound was dry. Second dressing applied on the twentieth day. When this was removed, on the thirtieth day, the joint was freely movable, and the splints were left off except at night.

June 14th. The splints were finally left off, and the patient was able to bear his weight upon the foot. Only slight impairment of ankle movement.

20th. Patient discharged well, walking without crutch or cane.

CASE II.—John H., aged six years. (Reported with permission of Dr. Krouse, in whose service the case occurred.) November 19, 1895, patient was thrown from a street car, sustaining a compound comminuted fracture of the right leg, and what at first seemed to be an insignificant injury of the lower portion of the left thigh. There was a good deal of contusion here, and quite an extensive hæmatoma. The condition of the right leg necessitated immediate amputation below the knee. During the recovery from the amputation, which did not unite by first intention, the hæmatoma in the lower portion of the left thigh disappeared and revealed an epiphyseal separation at the lower end of the femur. It was evident that the epiphysis was tilted upward and forward, and that the lower end of the shaft was protruding into the popliteal space, where part of its lower square surface could be clearly mapped out. The leg was retained in flexion with weight extension, in the hope of reducing the dislocation. The general condition of the patient did not justify an operative interference until December 30th, when an open incision was determined upon. An incision about three inches in length made in the mid-line of the popliteal space very readily exposed the transverse line of separation. The square surface of the shaft, without any adherent cartilage, was readily laid bare. The upper

surface of the epiphysis, with its cartilaginous covering firmly adherent, had been tilted forward so that it was found to rest against the anterior surface of the upper fragment. Callus had not been thrown out. Extension failed to relieve the dislocation, even after the division of the nearest hamstring tendons. It was only after half an inch or more of the lower end of the femoral shaft had been chiselled away that the epiphysis could be tilted on its axis to a degree permitting approximation of the surfaces. After hæmostasis had been cared for, the wound was tightly closed except for silkworm-gut drainage. The leg was dressed in right-angle flexion.

During seven days after the operation it appeared as though primary union would result. This, however, was not accomplished, for the evidences of infection were seen on the ninth day, when the dressings were changed. Stitches had to be removed, since there was some suppuration.

The subsequent history of the case was that of ordinary infected compound fractures. The suppuration, which was at first extensive, gradually subsided, and that without necrosis. The patient was admitted to the Jewish Hospital on November 19, 1895, and remained in the institution until May 29, 1896, when he was finally discharged well.

This patient attends school regularly. In its growth the femur has kept pace with its fellow of the opposite side, although a sinus has formed, which I have been informed leads to a small sequestrum.

CASE III.—H. P., male, aged forty-three years, admitted to the Jewish Hospital June 5, 1892. Sustained a fracture of the right radius six weeks before admission. There are characteristic silver-fork deformities and radial abduction. The fingers are flexed, while extension of the fingers and wrist is limited. Pararticular firm œdema is very marked. During two days the arm and hand were retained in suspension to reduce the swelling. It was then evident that reduction had not been accomplished, although a large callus had been thrown out. The dorsal prominence of the lower fragment was very decided.

Operation, June 6th. An incision three inches in length was made along the outer border of the radius between the extension muscles of the thumb down to the bone. The periosteum was readily lifted from the callus. This was spongy and easily removed with saw and chisel, thereby clearly exposing the line of fracture. No evidence of impaction was found. Efforts at reduction failed until the bone was transversely divided with the chisel in the line of fracture. A reduction was then easily accomplished and the fragments retained in place. The wound was closed except for a small gauze drainage to care for the rather copious oozing. The arm was suspended during the first twenty-four hours after the operation.

The subsequent history was uneventful. After three weeks all dressings were dispensed with, and passive motion instituted. A supra-articular line of tenderness could be discovered, but there was no deformity. When the patient left the hospital, six weeks after operation, wrist movement was somewhat limited in dorsal flexion, and there was slight limitation of extension movements at the terminal digital phalanges. For all ordinary purposes the range and strength of motion of the fingers in flexion were normal.

CASE IV. — R. S., aged sixteen years, admitted to the Good Samaritan Hospital July 6, 1893. Four weeks ago from a fall patient sustained a fracture of the right radius. Efforts were made in the country, where

the accident occurred, to reduce the dislocation, but evidently without success. Splints had been used almost continuously since the accident. The arm presented the typical deformity of a Colles's fracture, with impairment of motion in the thumb, index, and middle fingers, due to binding down of the tendons within the tendon sheaths. Point pressure over the site of the fracture was exceedingly painful. Under anesthesia an effort was made to reduce the dislocation, but without success. An incision was, therefore, made along the outer border of the radius, three inches in length, and the fracture thoroughly exposed. There was no attempt at union. The line of fracture was readily discerned, and an impaction easily recognized. It was only after the bone was divided in this line with the chisel that reduction could be effected, and the deformity readily removed. The entire wound was closed without drainage, and the recovery was an uneventful one. Passive movements were commenced two weeks after the operation. The patient was discharged from the hospital six weeks after the operation with practically normal function of the wrist and finger movement.

CASE V.—R. F., aged nine years. Family history good; admitted to the Jewish Hospital December 26, 1895. On September 25th was run over by a bicycle and the right femur fractured a little below its middle. The fracture was very oblique, and shortening two and one-half inches. In the very beginning the case was treated by weight extension and lateral splints. Efforts at reduction made a week after the accident under anesthesia failed to reduce the shortening. After six weeks the union was quite firm, with marked outward bowing. Shortening between two and one-half and three inches.

Operation, January 2, 1896. Incision five inches in length from the outer portion of the thigh over the site of fracture. Hematoma had entirely disappeared. The fracture was very oblique. The fragments which had passed each other were united by a bridge of new bone. With considerable difficulty this was severed with the chisel. The medullary cavity of the upper fragment was closed by callus, the lower was still open. The upper fragment was freshened by the saw. A Senn bone-ferule, largest size, was now introduced and the fragment brought into good position. Silk-worm-gut drainage was resorted to, except for which the wound was tightly closed. A final recovery from the operation in this case was satisfactory in the extreme. Except during the first three days the temperature did not exceed 101° , after which it returned to the normal and continued so throughout the stay at the hospital. A fenestrated plaster-of-Paris dressing was applied immediately after the operation and retained in place six weeks. The patient left the hospital with the wound perfectly healed, on March 1, 1896. After he left the hospital some pressure necrosis from the ferule resulted. This was removed by Dr. E. W. Walker. The patient now, I understand, has a shortening of less than one inch, and walks with only a perceptible limp.

CASE VI.—G. M., aged thirty-three years, admitted to the Cincinnati Hospital May 12, 1896. Patient was in the hospital a year ago for delirium tremens. On the day of admission was run over by a stone wagon, sustaining fracture of the leg.

Physical examination reveals a fracture of both bones of the right leg midway between ankle and knee-joint. At the site of fracture there is a well-marked angle with outward opening. The foot itself is inverted,

toes pointing toward arch of opposite foot. Very considerable hæmatoma at the site of fracture.

Under anesthesia efforts at reduction were made. It is evident that a loose fragment intervened at the site of fracture, preventing reduction. Dr. Evans assisted.

Under A. C. E. anesthesia, an incision three inches in length was made over the site of the fracture, from which a large quantity of blood exuded. When the fracture was thoroughly exposed a spiculum of bone one-third of an inch wide and over an inch in length was found wedged between the main fragments, which could not be brought into apposition until the intervening spiculum was removed. Reduction was then easily accomplished. The entire wound was tightly closed in the hope that primary union would result. This was evidently a mistake, for suppuration ensued within a week, necessitating the removal of the stitches. Some necrosis of the bone resulted, so that on July 18th a secondary operation with bone sutures had to be made.

The patient was finally discharged with a sound leg, walking without cane and with less than one inch shortening.

CASE VII.—A. P., aged thirty-eight years, admitted to the Cincinnati Hospital December 22, 1896.

Present history. On date of admission patient received a gunshot wound of the forehead and of the left arm. When admitted she had recovered from shock. There was considerable hemorrhage from wound in the forehead, and she was unable to use the left arm. The wound of the forehead was a scalp wound and of no significance. On the outer side of the left arm about two inches below the acromion process was found the wound of entrance, probably made by a 38-calibre ball. Crepitus is felt if the arm is moved, and the head does not rotate with the shaft. An aseptic dressing was applied and external splints over extension. Both wounds in the scalp and in the arm healed by first intention.

January 16th. No evidence of union in the fractured humerus. A radiograph taken shows an oblique fracture about four inches below the shoulder-joint, with the lower fragment passing upward along the outer surface of the upper. The bullet is seen flattened against the inner side of the upper fragment, having evidently passed through the humerus.

18th. Under chloroform anesthesia an incision three inches long was made along the outer surface of the arm, by which the fracture was exposed. Between the fractured surfaces an unorganized blood-clot adherent to shreds of periosteum was found and readily removed with curette. The bullet was removed. When extension was applied the fragments were easily brought into apposition and retained by a wire suture. The wound was entirely closed by deep and superficial sutures.

The subsequent history showed an infection, which was limited to the soft parts and was readily relieved by removing a few of the sutures. The patient was discharged on March 3d. The bones had united by a large mass of callus; arm function practically normal.

REMARKS. Though the cases reported are few they are of sufficient diversity in regard to regional distribution and time of interference to warrant some general conclusions.

In two of the cases interference was immediate, and in two osseous union had occurred. In one of the cases of immediate operation sup-

putation resulted, whereas in the other complete primary union took place. In only two of the cases in which operative interference was delayed did suppuration result. The inference may possibly be drawn herefrom that early interference predisposes to infection. This can readily be explained by the lowered vitality of the contused tissues and their notably reduced resistance to infective processes. This inference is strengthened by reports from many surgeons who have resorted to direct mechanical appliances for fixation of fragments in compound fractures or for the cure of pseudarthroses. I would only refer to the cases in which Senn used the bone ferule and Bircher the ivory plug. Nevertheless, since in all of these cases, by the interference plus the infection, the end result was better than it would probably have been without operation, the patients were brought only into the condition of one who had primarily sustained a compound fracture.

The lesson is plain, however, that extraordinary precautions toward securing asepsis must be taken before the simple is deliberately converted into a compound fracture.

Of fractures through the epiphysis two cases are recorded, one of the lower end of the radius, the other of the femur. Both of these cases were operated upon before callus had been thrown out.

In two cases operation was delayed until quite firm union had been effected. The operations were, therefore, for vicious union. Although nature does much to cover the inequalities left from the fracture, in neither of these cases would a good result have been obtained without operation. The question is, therefore, pertinent, if when deformity is certain to follow fracture it is not better to wait until union has taken place. Aside from the doubtless greater danger from infection in immediate operations, no strong argument can be advanced in favor of delay. Particularly is this true in epiphyseal separations. In those of the lower end of the femur the danger to limb and even to life from compression of the vessels is very great. An early interference can only be of advantage whereby the production of deforming callus will be forestalled. The technical difficulties of operation before callus has formed are very much less than those which attend the operative corrections of vicious union after fracture. Such fixation of epiphyseal separation need not necessarily imply an open wound, since by means of long pins driven through the skin, Helferich has recently succeeded in fixing the humeral epiphysis. The same procedure was employed several years before by Lange, and the principle is that advocated by Senn in fractures about the hip. It is very possible that by means of such a drill and with skiagraphic tracing of the fracture, say of the elbow or of the ankle, before him, an operator can transfix fragments without open incision and retain them in position by means of the drill.

There are certain classes of cases in which open treatment should be

strictly ruled out, even if the deformity is great. In cases of crushed fracture, where extensive comminution can be made out, nothing could be gained from operative interference. Altogether, therefore, the cases in which the open treatment should be resorted to would be few and far between. Nor does the experience of the writer, or what he has gleaned from literature, warrant him in coming to conclusions that are final. Nevertheless, he believes that it would be justifiable to submit in a tentative way the following postulates:

1. The conversion of a simple fracture is justifiable when other means to secure the best end results fail.

2. In fractures of the diaphysis of the tibia, femur, humerus, and clavicle in which insurmountable longitudinal displacement or axial rotation has taken place, immediate operation or mediate operation before definite union has occurred is indicated.

3. In epiphyseal separations, when reduction cannot be otherwise effected, an early operation is justified.

4. Fractures complicated with dislocations irreducible by other methods warrant operative interference.

5. The involvement of a joint, except probably in the case of knee and hip, do not, *per se*, militate against operation if this is otherwise indicated.

6. If extensive comminution is present, as in compression or crushed fracture, operation is contraindicated.

7. Special precautions against infection must be taken, in connection with which should be borne in mind the dangers of too firmly closing a wound and the advantage of temporary tamponade and secondary suture.

8. Reckless and indiscriminate resort to the operative relief of deformity in recent simple fractures is to be condemned, since there would be few fields of surgery, in the event of an unsuccessful intervention, in which the contrast could be greater between the good intended and the harm done.

ON THE VALUE OF ATHLETIC EXERCISE AS A COUNTER-AGENT TO THE SEDENTARY PURSUITS OF URBAN POPULATIONS.¹

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WE often hear that a healthy mind can only be found in a healthy body. This is a great fact. We too often meet with instances which illustrate the converse of this, and have no lack of opportunity of wit-

¹ An address delivered before the Birmingham Athletic Institute.

nessing the mental distempers begotten of ill-developed and sickly bodies—to wit, the ill-temper and irritability, the “fads” and crazes, the conceits and narrowness, the failure, and unhappiness that are apt to arise where mental energy is unchastened by robust corporeal activity. Nor are we unfamiliar with the reverse of this picture, since we all know what a monster may be evolved from unfettered and unlettered muscularity, in the shape of that brutal specimen of humanity, the prize-fighter, or that less disgusting, but not too useful, person, the man, or it may even be *woman*, whose whole aim in life is to display muscular force and agility. I have depicted extreme cases. We can find a mean; and a more desirable conjunction of mental and bodily wholesomeness, and the song of the “harmonious blacksmith,” with its pathos and its lofty moral tone, will not fail to commend to us the subject of it. And yet, again, for beauty of soul and character, combined with true English muscularity, I may simply mention the name of Charles Kingsley to illustrate what I mean.

The problem before us is to discover, if we can, how best to secure wholesome minds together with healthy bodies for dwellers in towns. The title of my paper appears to presuppose that town-life is in some way unfavorable, and that it requires correction. I affirm, forthwith, that this is the case; but I proceed to maintain that this is not necessarily a fixed law. Can we affirm the contrary, and declare that rural life secures the highest and best level of bodily or mental health? I am not at all prepared to accept this view without some reservations. No doubt the Irishman’s opinion on this matter best settles the question. He said “*both* were best,” the ill effects of the one to be counteracted by the benefits of the other. But this solution of the difficulty is, perhaps, hardly more within the reach of practical attainment than is his scheme for his own “home rule.” If bodily work, good food, and good homes were attainable in rural life, together with sufficient mental occupation, that would doubtless be the ideal life for a large number of our countrymen, and they would cease to crowd unwholesomely into towns. I for one hope to see the day when the cultivation of the soil will again prove sufficiently attractive to keep country-born men in the country. In the mean time, town-life, as too commonly led, though less than formerly, uses up and destroys so much humanity that large drafts are called for from the country to make good the deficit and to carry on our manufactures. With amended conditions of urban life, we may hope to grow such an urban stock as may supply sufficiently what is needed. Of late years the schoolmaster has been quickening the rural intellect and inspiring it with ambition to lead a more intense life; for its owner to wear the black coat and high hat, and to be rather ashamed of short sleeves and bare arms, as if a three-legged stool, a steel pen, and a home in a long row of unlovely little houses were the

greatest desiderata of existence. Thus the schoolmaster and the cheap newspaper, together with agricultural depression, have between them caused an exodus from broad acres into our towns. Hence, more struggle and less wholesome environment, devitalization from concentration, and the presence of many knotty civic and political problems.

Where is urban muscularity amidst all this? Is it anywhere save in the arms of the mechanic where alone there is anything to be done with it?

I sometimes think that we in the towns may yet see the day when we shall produce, and supply, men trained and skilled to find a place in the country for their energies, when we shall return the drafts of aimless wanderers who come to us, seeking work and finding little or none awaiting them, to till the soil and draw from it its natural wealth ready for home markets.

We shall certainly not always be able to depend so much upon the foreigner as we now do for our supplies. We might give some technical education in the cities that would fit these men to cope more intelligently with agricultural problems than is now possible, for brains are required nowadays as well as strong arms in all departments of human activity.

My subject, as you see, appears to trench on politics. Far be it from me to touch such a sensitive plant within the limits of this great town. We physicians are not, and ought seldom, if ever, to be politicians. But we ought to be statesmen. I am commonly supposed to be a very inflexible Tory myself. But I regret to say that I entertain a very low estimate of politicians of all sides. I have little faith in any of them. The bent of my mind, as of all physicians, is to try and find out what is wrong, and to do the best at all costs to set it right. That is not commonly the bent of the purely political mind, and certainly not in fact is it the practice of any political party when in power. The medical mind knows of no compromises and of no half measures. Our remedies are designed to produce just the results and effects we wish, and we do not care, and we do not ask, whether the patient likes our methods or our physic. Our business is to get him well, and to do him real good, and we have no personal aims and no fear of any of our constituents.

None know better than we do how the influence and special environments of town life tend to impair the forces of both body and mind. These influences come into action from the first hours of life. We call them unwholesome and devitalizing, and it is not hard to tell why this is the case. They attack the body from many sides. We find, first, that the common air is so far tainted and charged with impurities, so devoid of some of its essential qualities, that it is inadequate for the purposes of promoting sound nutrition.

The atmosphere of our large towns is deficient in oxygen and laden with the products of a concentrated population of men and animals. It

is further charged with gases of imperfect combustion, arising from a vast consumption of fuel and of coal-gas, and it is also full of dust and soot. This is bad enough in well-appointed houses, with ample cubic space for respiratory purposes, but it is worse in small and ill-contrived dwellings. Crowding of houses and of population entail concentration of all these malign aerial influences. In the next place, there follows from this, in an atmosphere so moisture-laden as that of our island, an almost perpetual dust and soot-canopy overhanging our towns, which shuts out a great part of the little direct sunlight we are favored with in this latitude. What with positive additions of unwholesome elements to our air, and deprivation of oxygen and stimulating light, an urban population is seriously hampered in securing some of the best things worth having in this world. The result of this, if it were unmitigated, would be to produce both devitalization and mental and bodily depression, evidenced by stunted growth, pale faces, shrunken limbs, and such frailty as lays the population open to inroads of many degenerating ailments. While the body is growing there is especial need for fresh air and wholesome environments. When growth is complete, and a good constitution is established, there is far more resisting power and ability to bear the harmful influences of town-residence. These facts are now well established and form part of common knowledge, and, by degrees, efforts have been made, in the last forty years more especially, to counteract the malign influences I have referred to.

I know well that authorities in this town are well in the van of those who have been active in demolishing "rookeries" and securing air-spaces for the people, and they are now reaping the benefits of this wise procedure on the part of one of the most enlightened municipalities in the kingdom. If I am not mistaken, there is still a good deal more to do and to accomplish before the atmosphere rivals that of Pittsburg, now so improved, the Birmingham of the United States, which, when I knew it, twenty years ago, was something never to be forgotten. A few more coal-strikes, and we shall learn to be much less dependent on crude fuel of that description, "stinking coals," as Ruskin calls them, and have to turn our colliers out of the bowels of the earth to plow its surface in the face of heaven.

To return, however, to consider other malign influences of town-life. One very difficult matter for citizens is to secure sufficient bodily exercise. If we are engaged in business, we must needs dwell near our work. In early life there is a natural craving in healthy persons for exercise in the open air, and when business pursuits are followed with the freedom from worry and anxiety which seldom attaches to 'prentice hands, the mornings and evenings of summer and the modern half-holiday are fully availed of. Hence, the cricket and foot-ball fields are in request by all wholesome young Britons.

The cyclists, too, so improperly called by Mr. Edmund Yates "cads on casters," nowadays are not disposed to lose their opportunities for trundling along our roads in all directions. All this is excellent.

One great advantage of active exercise and of athletics in general is that no one can be excellent or proficient in them who is not always perfectly temperate in the use of strong drinks. You cannot imagine a cyclist given over to drink, or a vigorous foot-ball player or a marksman amongst volunteers who did not know how to control himself in the presence of the tankard or the bottle. Hence we hail all athletic pursuits as correctives of our terrible national proclivity to take too much strong liquor.

As middle-life is approached and business becomes more serious, marriage being accomplished and olive branches having shot out, men tend to sit closer to their work, and gradually give up their exercise. They say they have no time for it, and they gradually lose zest for what is so needful, so imperatively needful, if they are to maintain vigorous minds in vigorous bodies.

I allow that there is instinctively a growing disinclination for the activities that were formerly attractive and pleasant in earlier life, and a tendency to grow stout, perhaps corpulent, especially below the belt, at the time of life I allude to. But it is not to be accepted or encouraged. I appeal now to the wives and sisters of such men as I describe, and must ask them to urge their better halves or their brothers to take sufficient active exercise, and to have a pride in their figures, and I must ask these men to feel humiliated and sorry when their tailors offer them congratulations on their increasing dimensions and the necessary draft on broadcloth. For this is regrettable, truly a sign of degeneration, and not, in most instances, indicative of vigor of body. Never lose your "frock-coat figure," once said a witty Irishman.

Those of you interested in athletics may very readily recognize a townsman by grasping the upper part of his arm. You will find it commonly thin and soft as compared with his forearm or with the muscles of his thighs and his calves. This shows that the legs of a townsman are in better condition than his arms, also, that the use of his hands entails a better state of the muscles of his forearms, while his flabby upper arms indicate that he has little occasion to exercise them.

If the upper arms remain idle there will be small play of the chest, insufficient expansion of it, and therewith a tendency to various forms of weakness. Such a man could do little to defend himself in a tussle, to swim efficiently, or hold his own in emergencies, such as escaping from a house on fire or from a shipwreck. Very simple exercise will soon remedy this failure, and place our townsmen at an advantage, with direct benefit to general health. Every Englishman is supposed to know how to use his fists on occasion, and, as a witty American has

said, "He always carries them with him;" but if he cannot hit out well from his shoulder, he will be a poor match for a garroter or other wary assailant. The use of clubs, dumb-bells, single stick, and the excellent practice of boxing will supply the necessary development; while crick-eting and rowing furnish the best correctives in summer time.

The object to strive after is to be sufficiently trained *all over* as to the muscles of the body, and no extraordinary efforts are needed to secure this much.

One harmful custom, now so prevalent, must be noticed. I allude to the too great use now made of omnibuses and tramcars by townspeople.

I am sorry for any shareholder in such concerns, but I wish to say that nowadays many persons drive who would be far better if they gave themselves time to walk to and from their places of business, and made the effort to do it. I take it that an average citizen needs daily not less than six or seven miles of walking exercise, or its equivalent in other muscular effort. The jostle and haste connected with short railway journeys are also inadvisable, and much harm undoubtedly comes from the rush to catch trains after a hurried breakfast. You do not suffer here, I imagine, from underground railways in which an abominable atmosphere has to be breathed. We know too much of their evils in London, and those who are wise take care to use them as little as possible.

The fact is that townspeople need all the fresh air and muscular exercise they can possibly get. This occupies time, and as time is said to be money, exercise and air are treated as unproductive and unnecessary; albeit you may rest assured that your money may cost you too dear if you neglect your body and the inexorable demands of nature. I am speaking of the laws that apply to the majority of people, for one meets with individuals who appear to thrive fairly well without much air and exercise.

Women can better than men resist the necessity for these. I generally use this argument, however, to enforce the good old doctrine that women are intended to be "keepers at home," while men "go forth to their work."

I will next remark that often in the case of sedentary lives where plenty of brain-work is carried on, there may be an excellent appetite. The muscles may be but little used, but a well-worked brain demands plenty of food, and all appears to go on well. But very often under these conditions we meet with irritable brains, peevish tempers, and an unsatisfied mind, and the case lies in relieving the brain by way of muscular energy. In this way, as a rule, do we most often meet with the healthy mind in the healthy body.

There are many claims on a citizen's brain which do not affect a countryman's. The life of a great town is intense, and every sense is exercised and quickened, the wits are sharpened, and the weakly go to

the wall. New-comers from the country are sometimes little adapted to the new environments awaiting them in towns, and not seldom make shipwreck amidst them, both of their bodies and their souls. They may inherit capacity for such a measure of muscularity as their newly-sought pursuits can never supply; they must work with their brains instead, and unless good influences are soon brought to bear on them, they may very rapidly begin a downhill course. For such persons an institute such as this may well prove a vast boon, encouraging them to muscular accomplishments which they are well fitted to excel in, and to find wholesome-minded friends. I am no believer in universal or free education to furnish the highest guide to morals. I am old-fashioned enough, though not an old man, to believe in the good old God-fearing, even if not very dogmatic, teaching as the best guide to conduct, and I find much room nowadays for the inculcation of the wisdom of Solomon. I have no belief whatever in any melancholy puritanical environments or restraints for the active and happy lives of young people, for I have had a terrible, and no small, experience of them. I believe in robust training for body and for soul, for both, and not for one without the other. And I will boldly affirm that to supply sound physical, and that is mainly muscular, training to any young man or woman is to do a good half of the work that the most devout and saintly person could wish to see accomplished for their highest interests, both here and hereafter. I say this because I know that no excellence or regular practice in athletics is possible together with intemperance or uncleanness, and because I know that gross appetites and carnality only grow in unexercised and ease-loving bodies. Swine can well become fat with full troughs in a foul sty.

There is a great sense of satisfaction enjoyed by persons in a condition of training, and even a moderate degree of this special muscular fitness is worth securing. Here, according to the late Dr. Parkes, are some of the happy results: "A clear skin, a bright eye, a cheerful temper, easy and rapid movements of the body, improved breathing power, firm muscles which resist bruising, and increased recuperative power after injuries." It needs small knowledge of an urban population to satisfy one that much yet remains to be done to reach a measure of healthiness approaching this, but I venture to promise to the majority of those who properly avail themselves of the advantages of this institute many of the good things just enumerated. They will hardly fail to make themselves better men, better Englishmen, and so surpass the average citizen of other countries. Not that muscular prowess is to generate undue pride or self-conceit, for strong men, knowing their powers, should be, and commonly are, both gentle and modest in their demeanor, and above all men are, and should be, the most chivalrous in the defence of the weak and of the gentler sex, the most unselfish and self-sacrificing.

I may next try to point out how, as citizens, you may avail yourselves of this athletic institute in this town. I have already stated that men over forty years of age become gradually disinclined for any but moderate exercise of their muscles. It has been said on good authority that no one after this age should run to catch a train, lest he should dangerously strain his heart. I much fear such risks are ventured upon every day. But such a warning by no means implies that exercise should be materially curtailed. Only violent forms of it should not be practised. The natural disinclination should not be quite disregarded, but athletic feats must not be expected or encouraged after forty years of age in the average man.

If a professional athlete is capable of these, it is because he is in constant training, and must needs lead a careful, wholesome life. He can follow no sedentary pursuits entailing confinement in close rooms for many hours. There is a natural tendency to stiffness and a loss of resiliency in the textures which renders it hard to compete with younger men when middle-life is passed. Albeit, there may be remarkable agility and great muscular power at this period in healthy men who have followed some athletic pursuit in early life. The danger attaches to the practice of athletics for the first time in middle-life without previous training in earlier years. Such men should begin very gradually, and for short periods. Light clubs and gentle exercises which expand the chest are best at this period. No heavy work, such as lifting weights, or exercise entailing sudden spurts of energy are advisable. Ordinary drill with precise and smart movements will well correct the stooping gait and slovenly slouch of many citizens, setting back the shoulders, and giving an uprightness of carriage much to be desired. Our citizen volunteer army bears efficient witness to the benefits derived from this. For graceful carriage and poise of the body I know of no exercise better fitted than that of fencing, one too much neglected by Englishmen, and the earlier it is begun the better. The perfection of military drill is that of the lance-exercise, which secures the finest and most accurate agility. All exercises tending to expand the chest are of great value, and must be allowed to give to those who follow them many chances in warding off diseases of the lungs.

If only a moderate amount of athleticism is permissible, though very advantageous to men in middle-life, it is certain that younger townsmen may by degrees attain to the highest excellence and developments in it. Hence I may very strongly urge younger men to carry on here every form of muscular activity, for they will thus be equipped to carry on such exercise far into their future lives without the risks attendant in the case of older persons.

Another point I would lay stress upon, and it is this, that all such exercises should be regular, and not carried out by fits and starts.

Those who enter here should arrange the time-table of their lives so as to secure leisure for the work they purpose to do.

For the average entrant here, I would further state that I look with disfavor on all attempts to do very extraordinary feats. The word *athlete* signifies one who contends for excellence or for a prize. We must use the word with some special reservation as applied to city men in general. These are times in which every one strives to "break the record," as the expression goes, to jump further or higher, to lift heavier weight, to cover the ground in less time than has ever been done before. All this may and can be done; but not by the average man; and remember most of us are average men, and are not designed for extraordinary performances in perhaps any walk of life. Such attempts can only injure the average man, and do him more harm than good. They are ill-adapted for dwellers in towns who have their bread to win at the desk, in the shop, or in the factory. When I give this warning I by no means wish to discourage the man blessed with extraordinary muscular endowments; but he is exceptional, be it remembered, and the aims of average citizens had better be rather less ambitious. I doubt not you could give me an array of examples which controvert my teaching, and would say I think too poorly of the potentiality of the average citizen. But I am not speaking without full knowledge of what is best in the long run for such a person, with his peculiar mode of life and environments. Young men at the universities who are well fed and live in pure air may well be subjected to higher tests and strain than city men who follow sedentary pursuits. It is not in accordance with my experience that boys or young men should be coddled in town or country. I believe in the value of active muscularity for all not positively delicate or disabled by actual infirmities, and know well how the general standard of health may thus be raised for the majority of average youths by enforced efforts in this direction. I do not fear the frequent occurrence of the recent lamented result in the case of the somewhat notorious "Rugby run." You will never make an omelette if you are afraid of breaking your eggs. I feel sure, however, that all who enter upon a course of athletic exercises will do well to be medically certified as fit in all respects to perform them and profit by them, and I would add that prolonged runs demand especial fitness, and are only to be practised by men under five-and-thirty years of age.

We hear much of regulating hours of work for people in these days. I am not afraid of work. I believe in plenty of it for the best health of mind and body. It is worry that kills people. It is idleness that rots body, soul, and mind. It may be well to regulate the hours of work done under unwholesome conditions, as in mines and ill-ventilated workshops; and this reminds me that many shops and offices and chambers are occupied, even in these days, with scant attention to proper

ventilation by people who should know better. Little, if any, harm will come to those who pursue sedentary business in well-aired places, provided sufficient regular exercise be taken. I have no fear for the average outdoor laborer overworking himself. I often watch him at work, and envy his lot, east all day in the open air. I watch him leaving his work just when I am getting very busy, and envy him his leisure. I envy him his half-holidays, too, which I cannot get, and I have watched him spending them too often wasting his wages on himself, and converting himself into a besotted and defaced image of a man, stumbling home to sleep off his orgies well into the next Sunday afternoon. We doctors know these things, and the really industrious man has no better friends than among us. We shall tell him the truth, however, and not fill his head with nonsense, flattery, and discontent, but urge him to avoid scamping work, and to share his earnings soberly and righteously with his wife and family.

I feel very sure that until the laboring man has learned to spend a sober and domestic, or profitable, half-holiday, he had far better be without it, and doing something useful. Your athletic institute, however, is not for them. Their muscles are sufficiently exercised, and we would urge them to cultivate their minds by visits to museums, picture galleries, and well-ordered reading-rooms, to social clubs where the professional agitator cannot enter, and where beer and tobacco may be used and in no degree abused.

But I fear I am wandering into paths where I have no right to stray. My thoughts were centred on urban life, with its hard problems, its snares and pitfalls, and I bethink me now of a passage in one of the sermons of that great prophet of modern times, Charles Kingsley, who delivered himself twenty-two years ago of the following burning words, which I will read to you :

“ I can conceive a time,” said he, “ when by improved chemical science every foul vapor which now escapes from the chimney of a manufactory, polluting the air, destroying the vegetation, shall be seized, utilized, converted into some profitable substance, till the black country shall be black no longer, the streams once more crystal clear, the trees once more luxuriant, and the desert, which man has created in his haste and greed, shall in literal fact once more blossom as the rose. And just so can I conceive a time when by a higher civilization, formed on political economy more truly scientific, because more truly according to the will of God, our human refuse shall be utilized like our material refuse ; when man, as man, down to the weakest and most ignorant, shall be found (as he really is) so valuable that it will be worth while to preserve his health, to develop his capabilities, to save him alive, body, intellect, and character, at any cost ; because men will see that a man is, after all, the most precious and useful thing on the earth, and that no cost spent on the development of human beings can possibly be thrown away.”

I would fain let these be the last words I uttered before you to-night, but I must not conclude without first offering you my hearty congratulations on the most excellent means you have instituted in this building for combating the ill-effects of sedentary and town lives. Here, at least, is an unalloyed source of good and benefit. Who can declaim against this institution? Who dares to decry your efforts? When the local historian comes to describe the deeds of those who have worked with a public spirit for the best requirements of the people of Birmingham during the last quarter of this century, my belief is that he will not fail to mark the very important part played in that great work by the wisdom and shrewd good sense of those who devised and perfected the athletic institution in this town.

NERVOUS DEAFNESS IN DIPHTHERIA.¹

BY J. C. WILSON, M.D.,

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I REPORT the following case at some length, first, because sudden bilateral total deafness in diphtheria is exceedingly rare; secondly, because of the importance of this complication; thirdly, as illustrating the rapid disappearance of a tonsillar false membrane after the administration of an efficient dose of diphtheria antitoxin serum; and, finally, because it illustrates some phases of uncertainty in regard to the diagnosis of membranous sore-throat.

Follicular tonsillitis in an adult; moderate fever, occipital headache, tinnitus aurium et cerebri; fourth day, dense pellicular exudate upon tonsils, conjunctivitis, increasing tinnitus and deafness; injection of diphtheritic antitoxin serum; a few hours later, total deafness, with slight vertigo, great chemosis of the conjunctive; gradual deferrescence, completed by the fifteenth day, at which date there was partial paralysis of accommodation, together with paresis of extensor muscles of the head, persistent tinnitus, slight vertigo, and absolute persistent loss of hearing.—A married woman, thirty-three years of age; the mother of three children, the youngest being about seven years old; a private patient; was first seen in present illness November 12, 1896. She complained of sore-throat, which had begun the previous evening. Upon inspection there was observed general redness of the velum, half arches, and tonsils, with swelling of the last more marked upon the right side. Upon the right tonsil there were eight or ten small, discrete, grayish-white patches about 2 mm. in diameter. The exudate composing these patches was with some little difficulty detachable from the surface of the tonsil, and evidently occupied the openings of certain of the crypts. The other tonsil was free from exudate. The patient complained of pain on swal-

¹ Read before the Association of American Physicians at Washington, D. C., May 5, 1897.

lowing and headache, most intense in the occipital region. The temperature was 103° F. The treatment consisted in the administration of $\frac{1}{16}$ of a grain of calomel, 1 grain of Dover's powder, and 2 grains of caroid every hour, together with the use of a gargle consisting of equal parts of a 15-volume solution of hydrogen dioxide and cinnamon water, and the local application of hydrogen dioxide solution, full strength, once a day, by means of a cotton carrier. On the following day the condition of the throat was much the same, save that the grayish-white patches had entirely disappeared from the right tonsil, while similar patches had shown themselves upon the left tonsil.

Nov. 14th. Throat less painful; swallowing less difficult; headache has disappeared. Temperature, A.M., 100.4° F.; P.M., 100° . Treatment continued, the powders being administered at intervals of three hours. Hearing impaired; the patient complains of distressing tinnitus, referred to both ears and to the head generally. On inspection of the throat there is seen a slight uniform, grayish film, about 1 cm. in diameter, upon the lower portion of the right tonsil.

15th, 8 A.M. The patient had passed a restless night, suffering from constant and distressing roaring in the head and ears. The temperature had fallen to 97° F. There was marked and painful conjunctivitis, the vessels being deeply injected. The greater portion of the right tonsil was covered with a dense, grayish-white exudate, the borders of which were abruptly marginate, surrounded by a deeply hyperæmic zone. A similar though less extensive exudate had formed upon the left tonsil. Restlessness, constant nausea, occasional vomiting. The patient complains of pain in the eyes; rapidly increasing deafness and distressing sounds in the head, like bands of music, fire-engines, etc.

At 10 A.M. the temperature had risen to normal. Diphtheria antitoxin serum (Behring), 1500 antitoxin units, was injected into the right interscapular space. Treatment: small doses of calomel, alternating with tincture of the chloride of iron and a laxative enema; alcohol in the form of milk-punch and champagne. As an hypnotic, chloral in 15-grain doses at night. For the eyes, a weak alkaline lotion. Locally, hydrogen dioxide solution applied with a cotton carrier, full strength, every hour. At this time a culture was made and forwarded to the bacteriological department, and notification of the case as one of diphtheria sent to the Board of Health.

At 2 P.M. vomiting ceased and did not recur.

At 5 P.M. total loss of hearing. At this time great conjunctival chemosis, the oedematous conjunctival tissues rising prominently above the corneal margins and preventing the approximation of the edges of the eyelids. No pain in or about either ear, nor tenderness upon pressure. Temperature, P.M., 100.8° F. Urine: specific gravity, 1022; a trace of albumin; no casts.

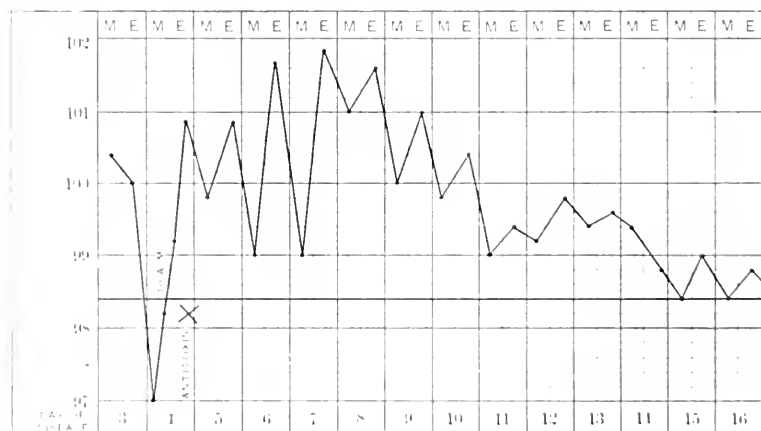
16th. Conjunctivitis more intense; condition otherwise the same. The inspector of the Board of Health placed upon the front door of the house the usual poster indicating the existence of a case of diphtheria within.

17th. Membrane in the throat has disappeared. The patient had a more comfortable night and slept several hours. Upon examination the tympanic membranes are bright red, but glistening and not bulging. The report of the Board of Health received. The bacteriological investigation failed to show the presence of the Klebs-Löffler bacillus.

Some doubt as to bone-conduction, the patient being unable to discriminate positively between auditory sensations and the vibrations of the tuning-fork. Eyes treated by cold compresses.

18th. Bowels freely moved by enema. Large quantity of mucus in stool. Upon examination in a vessel of water sheets of pseudo-membrane and a tubular cast. The patient not known to have previously suffered from membranous colitis. Albumin has disappeared. The patient seen in consultation by Dr. S. MacCuen Smith, who visited her from time to time subsequently. Later she was also seen by Dr. Charles H. Burnett. Neither at this time nor at any subsequent period were there evidences of inflammation of the *middle ear*. From this time for a period of a week free sweating was induced every day by a hypodermic injection of pilocarpine. Upon notification of the negative report from the bacteriological laboratory, the Board of Health caused the yellow poster to be removed from the front door of the house.

19th. Loss of power in the muscles of the back of the neck. The head falls forward and rolls to either side. Tinnitus continues.



20th. Free movements of the bowels, with a large quantity of stringy mucus.

29th. During this period the chemosis has gradually subsided, and the eyes are now practically well. Patient thinks she can hear the street-cars and wagons, but upon careful testing it is evident that she perceives only the vibrations of heavy vehicles passing. Up to this time her power of modulating and otherwise regulating her voice has been very imperfect. Some gradual improvement in this respect noted.

Dec. 4th. The patient able to be out of bed for a few moments. Station only slightly impaired. Very moderate dizziness. Deep and superficial reflexes unimpaired. General nutrition improved. Tinnitus still constant and distressing. It is referred now chiefly to the ears. The membranous colitis treated by daily high enemata of silver nitrate 1:1000. The tincture of the chloride of iron discontinued, the compound syrup of the hypophosphites being given in its stead, together with arsenic in the form of Fowler's solution. The membrane tympani present a normal appearance, the redness having entirely disappeared.

16th. At the suggestion of Dr. Burnett the method of Lermoyez was employed, with the view of determining whether or not the deafness was due to anemia of the internal ear. This method consists in the administration, by inhalation, of amyl nitrite. Five minims were poured upon a towel and held to the patient's mouth and nose. Intense flushing of the face immediately followed, the patient at the same time crying out, "Oh, my head!" and stating that the roaring, which had been confined to the ears, was now felt over the whole head with unusual violence. Her condition was most distressing, but passed off in the course of eight or ten minutes. The test was repeated a few days later with the same result.

It was noted upon the 20th that the noises in the head were much louder. They were described as being like the sound produced by the tearing of muslin, fire-engines, car-bells, and the like. The patient is now slowly acquiring the sign alphabet of the deaf and dumb. Communication with her is conducted by writing. She complains of difficulty in reading, and now suffers much from headache.

On the 28th, station was much more impaired than at any previous time, and there is distressing vertigo, with headache. This condition continued for three days and passed off after brisk purging. The indications of membranous colitis continue.

29th. Blood examination by Dr. F. A. Packard, who made the following report: 5,025,000 red blood-cells, 1 white to 301 red. Hæmoglobin 70 per cent. Differential staining shows no abnormality.

The patient occasionally complains of double vision.

February 24th. The condition of the patient has gradually improved. The double vision has disappeared, the difficulty in reading diminished. Annoying tinnitus continues, together with slight vertigo and disturbance of equilibrium. The muscles of the back of the neck continue to be parietic. Deafness remains absolute, both to ordinary sounds and the tuning-fork held in contact with the skull. The patient can now distinguish between auditory sensation, which she cannot hear, and the vibration of the tuning-fork, which she readily perceives.

Dr. de Schweinitz about this time examined the patient, finding no lesion in the eye-ground, except a slight œdema of the retina and paresis of the ciliary muscle amounting to a loss of about one-third of the accommodative power.

At this date the patient went to Florida, where she spent some weeks, improved in every respect, and in particular wholly recovering from the membranous colitis.

Total deafness, annoying tinnitus, slight vertigo, impairment of station, and paresis of the extensor muscles of the head persist at the present time (May 1st). The patient has only of late realized the nature of the misfortune that has befallen her in the loss of hearing, and has become apathetic and depressed.

The patient comes from a long-lived race on both sides. The father is living at the age of seventy-three years, but suffers from advanced interstitial nephritis. The mother is gouty and has gouty kidneys. There are two brothers and one sister in good health. One sister died of some acute septic process following confinement. The patient has never had syphilis; this subject has been very carefully investigated.

She is a perfectly well-balanced, reasonable woman, with a good nervous system, and has never shown the stigmata of hysteria. The possibility of hysterical deafness may be dismissed from consideration.

Notwithstanding the negative report from the bacteriological laboratory, it is assumed in the title of this communication and in the discussion of the case that the disease was diphtheria. That it was clinical diphtheria is beyond question. The nature of the throat lesion, the character of the exudate developing after local lesions presenting the phenomena of lacunar tonsillitis, the rapid disappearance of the pellicle, leaving superficial erosions, after the injection of antitoxin serum, the impairment of accommodation and the double vision, together with the loss of power in the muscles of the neck, fully justify the diagnosis. Whether the bacteriological diagnosis failed because of the local treatment prior to the making of the culture, or not, cannot be known. The negative report from the Board of Health permitted the removal of the yellow poster from the front door of the house, and no further attempts to establish a bacteriological diagnosis were deemed expedient, however interesting they might have been from a scientific point of view. Nothing would have been gained with reference to prophylaxis, seeing that the patient was placed in an apartment by herself, was attended constantly by a thoroughly trained nurse who held no communication with the rest of the household; that the children and junior members of the family were immediately sent away; that systematic disinfection was practised throughout the course of the attack, and that immediately upon the patient's recovery the rooms which she and her nurse had occupied were disinfected with the formaldehyde apparatus by the Board of Health. No case of disease traceable to this patient developed in any member of the household or any visitor.

Quite recently, at a time when it seemed to me desirable to place this case upon record, I communicated with Dr. Abbott, the medical officer in charge of the bacteriological laboratory, with a view of obtaining a fuller report, but learned that the slide upon which the report was based had been destroyed.

Sudden loss of hearing occurs after mumps, epidemic spinal meningitis, and during secondary syphilis. It indicates a lesion of the eighth nerve, either in the brain or in its peripheral distribution.

Buck¹ makes the statement that "if with the loss of the hearing there are associated the symptoms of dizziness, marked subjective noises, and a staggering gait, the diagnosis of an auditory nerve-lesion, probably labyrinthine, may be assumed with a good deal of confidence."

Hoyell² states "that absolute deafness is pathognomonic of diseases of the labyrinth. It is very rarely met with, for there are few patients

¹ Manual of Diseases of the Ear. Second edition, 1895.

² Treatise on Diseases of the Ear, London, 1894.

who are utterly unable to perceive sonorous vibrations conducted through the bones of the head."

In point of fact, an examination of the literature, necessarily cursory, leads me to believe that sudden, total, permanent, bilateral deafness is extremely rare, and I have been able to find no case in which it has occurred in diphtheria. A friend who has been kind enough to look through the entire series of the *Annales des Maladies de l'Orville*, etc., covering a period of twenty years, has found no such case.

Gruber quotes Moos,¹ who reported:

"The conditions observed in the temporal bones of three children who died from simple diphtheria, and in which the middle ear exhibited merely catarrhal changes. They were similar to those found in the labyrinth by Steinbrugge in cases of epidemic cerebro-spinal meningitis. The membranous semicircular canals were in many places partially or entirely filled up by a substance consisting of coagulated lymph and a large number of cells with one or more nuclei. The mass exhibited concentric stratification and more or less advanced development in the direction of connective tissue, bone, and blood-vessels, and was here and there adherent to the periosteum. . . . The bloodvessels were obviously congested, with rupture and extravasation of blood, thus producing breaches of continuity in the courses of the auditory nerve."

Loss of the osseous substance and invasion of the cancelli of the petrous portion of the temporal bone by chains of micrococci were noted.

No evidence of osseous lesions has been seen in the case that I report.

With reference to the importance of total bilateral loss of hearing as a complication of any of the acute diseases little is to be said. The remote possibility of such an accident adds greatly to the gravity of any acute disease.

It is necessary to speak definitely with reference to the administration of the diphtheria antitoxin serum in this case. This was done within a few hours of the recognition of the conditions justifying a clinical diagnosis of diphtheria. No reaction at the point of injection occurred. The temperature, which had been very low and was rising at the time of the injection, continued to rise slightly for a few hours. It is probable that the antitoxin had no effect upon the temperature whatever. The following day the general injection of the throat was less marked, and within forty-eight hours the false membrane from both tonsils had wholly disappeared, leaving superficial erosions, which rapidly underwent cicatrization. It is important to observe that on November 14th, twenty-four hours prior to the administration of the antitoxin serum, it was noted that the hearing was already impaired, and that the

¹ Gruber: Text-book on Diseases of the Ear. Second Edition, English translation, 1893.

patient complained of distressing tinnitus, referred to both ears and the head generally.

The antitoxin serum exerted an obviously favorable influence upon the condition of the throat, but failed to arrest processes involving the labyrinth and the subconjunctival lymph-spaces that had already made some progress.

CHRONIC CONTRACTION OF THE PROSTATIC FIBRES ENCIRCLING THE VESICAL NECK AND ITS TREATMENT.¹

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IF one examines the writings of Civiale, Roux, Velpeau, Caudmont, and other contemporary French genito-urinary authors, he will find much space allotted to what is termed by some of them neuralgia of the vesical neck, by others contraction of the vesical neck. The words "neuralgie" and "contracture" used by these writers are expressive of like conditions. Keyes, in his book, commenting on the meaning of neuralgia in this connection, states: "The French expression 'neuralgie' does not necessarily include the idea of pain, but signifies simply a nervous disorder, functional, not organic." Contraction of the vesical neck is used much in the sense of spasm of the vesical neck, the only difference being that spasm is supposed to represent a momentary condition of tonicity of the muscular apparatus surrounding the deep urethra, while contraction is indicative of a tonicity somewhat more lasting. Slade, who studied under Caudmont (*Boston Medical and Surgical Journal*, July 5, 1855), in trying to explain the difference between these two expressions says: "Contraction is distinct from spasm, which is essentially temporary. Although the former may commence with spasm, and may also be complicated by it, contraction comes on slowly, and generally disappears in like manner."

Contraction in the French sense is entirely a functional condition. It is not permanent, and it is associated with no pathological change in connection with the vesical neck. These terms are little used at present, since it is now known that they do not represent true diseased conditions, but only reflex vesical symptoms which frequently attend various pathological states of the sexual apparatus, the rectum, the kidneys, etc.

The condition which I am now to describe as chronic contraction of the prostatic fibres encircling the vesical neck represents a pathological

¹ Read before the Section on Genito-urinary Surgery at the Congress of American Physicians and Surgeons, Washington, D. C., May 6, 1897.

change in the part, and is consequently totally different from anything mentioned in the French literature, reference to which has just been made. I am convinced, however, that this condition of chronic contraction bears a relationship to the functional one in that it represents a pathological state which may apparently result from functional contraction or spasm in cases where, owing to some settled disorder of the sexual apparatus, the rectum, the kidney, or other part, functional contraction of the vesical neck has existed as a prominent symptom for a long period. The lesion in these cases of chronic contraction can be compared with that in connection with the sterno-cleido-mastoid muscle in chronic torticollis. It is permanent, rigid, and unrelaxable even under profound anæsthesia. If a boutonniere perineal incision be made while a patient of this description is under an anæsthetic, and the forefinger of the surgeon passed through the opening made in the floor of the membranous urethra backward, in an attempt to enter the bladder, the finger-tip will find itself tightly engaged in a ring-like contraction in the deeper portion of the prostatic urethra, where under normal circumstances the canal should be wide, funnel-shaped, and elastic, merging itself into the vesical cavity in such a manner that it is impossible simply from the feel to determine just where the urethra ends and the bladder begins. A contraction of this nature, as I have said, is large enough in my experience to admit the tip of the forefinger, and consequently its calibre is so nearly that of the anterior urethra that its presence cannot be detected by means of a good-sized sound passed along the urethra. If the surgeon feels carefully with his finger-tip he will discover the urethra just in front of the circular contraction to be roomy and somewhat pouched. The mucous membrane of the entire portion of the deep urethra will ordinarily feel perfectly normal and free from any evidences of previous inflammation. If now an attempt be made to crowd the finger-tip through the contraction and into the bladder, it will be found either impossible or only possible as a result of tearing apart the circular bands. In case the circular bands cannot be ruptured they can be cut along the floor of the urethra, thus allowing the finger to slip into the bladder and to thoroughly explore the vesical neck. It will then be appreciated that there is no hypertrophy of the prostate, an absence of which should also have been suspected from a failure to find evidences of any enlargement from previous digital rectal exploration. After the contraction has been thoroughly ruptured or cut through, little evidence will be left to the feel to indicate the nature of the lesion which previously existed.

I have so far been unable to procure an histological examination of the unusual condition I have described, since all my patients suffering in this manner have recovered as the result of operation.

The clinical symptom prominent in cases of this nature, and in fact

it might be said the only true symptom dependent on the lesion itself, consists in an inability, either complete or partial, to void urine. This inability is of gradual development. It generally begins as a hesitancy in starting the stream, and then as the act of urination approaches completion there is a dribbling, due apparently to a lack of control over the vesical sphincter, together with a feeling that a want of power exists to completely empty the bladder. This complaint is at first intermittent in character, but after a time it becomes permanent. Next in order, the patient experiences temporary attacks of complete retention. For a number of hours he may be unable to urinate. Early attacks of this nature may pass off of themselves as a result of rest, sitting in hot water, etc., but after a time it will be found necessary to employ a catheter and to empty the bladder on one or several occasions before nature will reassert herself. Finally, all power to urinate naturally is lost, and permanent recourse to the catheter is necessary. If pain or other symptoms be present they are due either to the existence of some disorder of the sexual apparatus, kidney, etc., which has acted as the originator of the trouble at the vesical neck, or else to vesical infection, which has resulted from instrumentation or stagnation of urine consequent on the retention. This train of symptoms is of slow development, and three, four, or perhaps more years may intervene between the time when the first difficulty in connection with urination was noticed and retention occurs.

A diagnosis of this condition has to be made largely from the clinical history of the case, together with an exclusion of other causes for impediment to urination which present tangible evidences of their presence, the only positive evidence that chronic contraction exists being afforded by the feel represented to the finger-tip introduced through a perineal incision while the patient is under an anæsthetic. If, however, one studies the clinical history of his cases carefully and thoroughly eliminates the causes of retention which present tangible evidences, he can make himself fairly positive of the diagnosis before resort is had to operation, which serves the double purpose of settling the diagnosis and of correcting the disease. In a considerable majority of instances a clinical history of sexual disorders, associated with vesical irritability, will be found to have existed and for years to have been a cause for complaint. If in these cases an examination of the seminal vesicles be made by the educated finger introduced into the rectum, evidences of existing or past seminal vesiculitis will be discovered. Perhaps next in order a clinical history of chronic pyelitis or renal inflammation, such as might be caused by a calculus, associated with frequent and urgent urination due to reflex nervous action, will be found to have existed for years before vesical insufficiency has been finally established. I have never as yet seen a case where the previous history of rectal disease accompanied by

vesical spasm has been the forerunner of chronic contraction of the prostatic fibres encircling the vesical neck. I believe that instances of this description do exist. Generally, however, where rectal disease is supposed to account for persistent vesical spasm, the trouble is really in the seminal vesicles and not at all in the rectum. Vesical calculus and chronic cystitis might possibly act as causative agents by reason of the persistent tenesmus they occasion. I know of one instance where lasting and complete retention resulted from a chronic contraction in which the only assignable contributing cause for the prostatic lesion lay in a habit which the afflicted individual had accustomed himself to for years of holding his urine persistently for long intervals against the dictates of nature. Gradually his vesical sensibilities became blunted to a marked degree, and chronic retention established itself as a final result. A history of this case will be detailed further on.

After the aid derived from the clinical history the next step is to exclude other possible causes for retention. Organic stricture of the urethra should be demonstrated to be absent. Rectal exploration should fail to detect inflammatory enlargement of the prostate or extensive induration of the post-prostatic connective tissue. Senile prostatic hypertrophy should be excluded as far as it is possible to do so by the rectal feel and also by the age of the patient, since most instances of chronic contraction occur in persons between twenty-five and fifty years of age. Disease of the spinal cord should be eliminated. Vesical atony, of course, is present in the great majority of cases where obstructive retention has existed, so that dependence on a catheter has become necessary. Atony of this description, however, always gradually disappears after the removal of the obstruction. Atony dependent on spinal paralysis persists as long as the paralysis exists. So vesical paralysis is significant and lasting only when it depends on disease of the spinal cord. An endoscopic examination of the urethra should be made to see that a papilloma does not exist. A cystoscopic view of the bladder should also be taken on general principles. After these eliminative examinations the question remains of deciding whether the condition which supposedly exists at the vesical neck is a muscular contraction capable of being relaxed if the exciting cause is removed, or whether it is a chronic contraction, such as I have described, which is incapable of relaxation. The case should accordingly be examined to see if a cause exists such as may occasion a reflex muscular spasm or contraction at the vesical neck. If such is found it should be removed or so modified that it no longer produces reflex spasm. Thus if seminal vesiculitis, pyelitis, rectal disease, or other condition capable of acting in like manner, is discovered, it should be treated.

If no cause can be found productive of spasm at the vesical neck, or if the symptoms of retention or difficulty in voiding urine persist after

such cause has been removed by treatment, then it is advisable for the surgeon to make a perineal boutonniere incision, and, by means of the evidence furnished to the finger-tip, to make positive the diagnosis which his preliminary study had made most probable.

The only treatment for chronic contraction of the prostatic fibres encircling the vesical neck which in my experience has shown any favorable results consists in thoroughly rupturing or in cutting through them. This can be accomplished by means of the finger or the knife, as the case may be, introduced through a perineal incision. Perineal vesical drainage should be practised after the operation. Treatment such as this at my hands has been followed by complete disappearance of all subjective symptoms.

From a considerable number of cases of this disease upon which I have operated I will detail the clinical histories of the four following by way of illustration :

CASE I., forty-two years of age ; first seen by me in the spring of 1895. His complaint then was a difficulty in voiding his urine. On some occasions his stream would be of fair volume, but at the best it would always end with a dribble, accompanied with a sensation as if the bladder were not emptied. Oftentimes on feeling a desire to urinate he would find himself able to void little, if any, on first making the attempt ; but after repeated trials and a delay of an hour or so micturition would finally be accomplished. His idea was that any violent effort, exposure to cold, or undue excitement, would be capable of causing a temporary inability to urinate. On most occasions at the end of micturition there was a burning sensation extending along the anterior urethra. When this sensation was intense it was at times associated with a dull pain in the suprapubic region as well in the perineum. On two or three occasions before being first seen by me his retention had been severe and lasting enough to require the use of a catheter. This use of the catheter had been followed by a cystitis on each occasion. His urine when he presented himself was free from pus and showed no evidences of renal disease. He was married and had one child about ten years of age. Had had gonorrhœa and syphilis, so he stated, before marriage. His urinary symptoms had been coming on for a number of years, and were gradually increasing in intensity. He spent fully one-third of the days each month in bed, as he felt the rest and warmth afforded by this treatment essential to stave off the attacks of retention. All through his early life he had been unduly amorous, and had indulged himself sexually to an excess. Latterly the sexual act had become very exhausting to him, and ejaculation had been followed by pain. For some years before the symptoms of urinary retention had developed there had been frequent and urgent urination. Previously to consulting me he had visited many surgeons. His treatment had been anterior injections, endoscopic applications, and sounds. These methods had, in his opinion, aggravated rather than improved his condition. I examined him most carefully. He had no spinal disease. He had some vesical atony. His kidneys were not misplaced or enlarged. Rectal examination showed the prostate to be apparently

normal. There were evidences of seminal vesiculitis of long standing in connection with both sacs. There was no stricture. The deep urethra, however, was excessively hyperæsthetic. My diagnosis lay between spasmodic muscular contraction of the vesical neck, dependent on the seminal vesiculitis, and a chronic contraction of the prostatic fibres encircling the vesical neck, with the seminal vesiculitis existing as a predisposing cause. In order to settle this final question of diagnosis I subjected the seminal vesicles to a course of stripping, in order so to improve the vesiculitis that the symptoms at the vesical neck would disappear, provided they were due to reflex muscular contraction. After this the patient improved much sexually, but still his symptoms of retention persisted. I then made my diagnosis, and advised perineal section. This diagnosis and opinion, however, was actively opposed by other medical authorities, who considered the case one of neurasthenia. I felt that this opposition was natural and just, as all I could advance to back up my own opinion was my personal authority. I accordingly thought it best to allow the case to be treated as one of neurasthenia, and quietly to await developments. In the spring of 1896 I was notified that as the result of an attack of complete retention no urine had been passed for ten days without the aid of a catheter; that the bladder had become infected; that the temperature was then ranging about 104°, and that suppression was threatened. There was then no opposition to operation. I performed perineal section and found a marked chronic contraction of the vesical neck. This I thoroughly cut through, as it was too fibrous to tear. The bladder was then drained through a perineal tube. The patient made a perfect recovery, and now, a year after the operation, he can pass a full, even, and forcible stream.

CASE II., twenty-seven years old; of good general physique; reported to me about one year ago, his complaint being repeated attacks of complete retention of urine. His stream for the last two years had at all times lacked force. He generally had some difficulty in starting it. The act also usually ended in a dribble. The calibre of the stream was often considerable. Drinking beer, exposure to cold, or any undue excitement would result in complete or threatened retention. Threatened retention might be averted by sitting in hot water. For complete retention on many occasions the use of a catheter had been necessary in order to obtain relief. He had had gonorrhœa eight years before. The rectal feel showed the prostate to be normal, but both seminal vesicles to be the seat of chronic inflammation, the origin of which was probably from the gonorrhœa. Ever since his gonorrhœa he had had some urinary urgency. He reported that his urine had been clear till the last six months. For his urinary urgency he had been treated for spasmodic stricture by means of large sounds, deep injections, and electrolysis. He had never received any apparent benefit, however, from such methods. About six months before seeing me, being seized with retention in a strange neighborhood, the urethra had been severely lacerated in an unskilful attempt at catheterization. This injury had been followed by fever and a persisting purulency of the urine. On examining his urethra I found a false passage on the floor of the membranous portion. In practising care in avoiding this false passage, however, a full-sized steel instrument entered the bladder, showing an absence of stricture. His urine showed no evidence of pyelitis. It was, however, foul and ammoniacal. It contained pus and bladder epithelium. He was

apparently on all occasions unable to wholly empty his bladder. From his history I judged that the vesical infection dated from the urethral traumatism which occurred six months previously. I performed perineal section, and then discovered the existence of a marked chronic contraction of the prostatic fibres encircling the vesical neck, a condition which I had strongly suspected. The contraction was so rigid that I had to cut it through on the floor. I also cut out the false passage and drained the bladder. The patient made a perfect recovery, and can now pass his urine normally.

CASE III., forty-five years of age, when first seen by me was entirely dependent on a catheter, and had been so for nine months, during which time he had not voided any urine voluntarily. Was married, and had never had any venereal disease. He was a market gardener, and for years his custom had been to cart produce to market. During these trips it had been his habit to hold his urine, no matter how much urgency to urinate there might be, until he reached his home. He so accustomed himself to holding back his urine that finally he apparently experienced little desire to urinate until the bladder became very tense. Nine months before great over-distention had occurred, and a catheter had to be employed. The bladder had never since shown any signs of recovering its function. For a month or so he had experienced little inconvenience from catheter life. The urethra was patulous and the bladder tolerant. He had never washed his bladder or cleansed his catheter. Consequently after a time the bladder had become foul and a phosphatic stone had formed, so that when he came to me he was in great vesical distress. Examination showed no stricture and no prostatic enlargement, but a vesical calculus, intense cystitis, and some renal tenderness, which suggested an ascending nephritis.

Litholapaxy in a case of this description was not advisable, as removing the calculus would only result in temporary relief. I accordingly performed perineal section, and discovered a marked chronic contraction of the prostatic fibres encircling the vesical neck to be the cause of the retention. These I thoroughly cut through. I then extensively dilated the vesical neck, removed the calculous deposit, and inserted a perineal drainage-tube, which was kept in place until all evidence of vesical infection had disappeared. The patient made a complete recovery.

CASE IV., thirty-five years of age, thin and wasted, consulted me for the first time in October, 1896. His complaint then was that he was forced to urinate about every fifteen minutes by day and every hour by night. The act was accompanied by painful tenesmus, but very little was voided at a time, and this with apparent difficulty. Between the acts of urination there was considerable dribbling, so that his clothing was wet and offensive. His urine, although acid in reaction, was extremely foul-smelling and loaded with pus and albumin. It also contained a few red blood-corpuscles. He was so weak that it was with much difficulty that he came to my office. Ten years previously he had had gonorrhoea, during the course of which he stated that retention of urine had occurred. He went to a hospital in Warsaw, and for four weeks he had to be catheterized. Since that time, although he had never been perfectly comfortable as regards his urinary act, still he had been able to follow his vocation of tailoring till about eight months previously, when, as a result apparently of exposure, he was again seized with retention. Dating from this last retention he had been in constant

distress, suffering from the symptoms of urinary urgency which I have described. He had been treated by vesical lavage and by the passage along the urethra of large sounds, but the treatment he had had seemed to him to have aggravated rather than relieved his condition. Examination showed the prostate to the rectal feel to be normal. There was no disease of the seminal vesicles. There was no stricture; no vesical calculus. There was considerable vesical atony and an inability to expel the last four ounces of the vesical contents. If the bladder were emptied by means of the catheter, blood would appear in the last half ounce passed, due to vesical tenesmus in connection with an empty condition of the bladder. As the result of careful study, the steps of which it is not here necessary to detail, I diagnosed hydro-pyonephrosis in connection with the left kidney. The spasmodic condition of the bladder I held to be due to the condition of the kidney. I also thought that the long-standing spasmodic contraction at the vesical neck might have resulted in a permanent condition of chronic contraction. If the contraction at the vesical neck had not become chronic I argued that a removal of the diseased kidney would be followed by a complete cure of the vesical condition; but if, on the other hand, the contraction had become chronic and permanent, then I considered the patient would be wholly cured only by a perineal section and a division of the contraction done as a secondary operation. Accordingly, in October, 1896, at the Post-Graduate Hospital, I did the renal operation. I found the left kidney markedly involved by hydro-pyonephrosis. The corresponding ureter was also dilated to the calibre of the small intestine. I removed both the kidney and the ureter. The patient made a good recovery and left the hospital at the end of four weeks. All his symptoms of vesical tenesmus left him as a result of the renal operation. His vesical insufficiency, however, remained. It was with the greatest difficulty that he could void urine, the removal of the element of tenesmus apparently serving to make the bladder seem weaker than before. In January last I had him re-enter the hospital. I then performed a perineal section and discovered a very marked chronic contraction of the prostatic fibres encircling the vesical neck, which I cut through on the floor. A large perineal tube was inserted and kept in place for ten days. The patient recovered. His urine is now clear and normal. He can empty his bladder completely, and his acts of urination are normal and perfect.

I have not been able to find any literature which apparently covers the ground of this paper. Belfield, however, may have had in mind a condition somewhat similar to the one I have described, although such does not seem probable, when he wrote his article on diseases of the prostate in Morrow's *System of Genito-Urinary Diseases*, etc., in which he speaks as follows of a condition called by him hypertrophy of the prostatic sphincter: "By this tentative term I have designated a morbid condition hitherto unrecognized in standard works. Post, of Boston, has described it in one case as a 'fibrous ring' in the prostatic urethra. Neither name is founded upon post-mortem examination, and both may hereafter be shown to be inaccurate."

As a clinical illustration, Belfield cites the case of a boy, nineteen years of age, who had had cystitis as long as he could remember, associated with frequent and painful micturition. On making a urethral

examination, a sound was arrested in the prostatic urethra by an obstacle that permitted only a fine bougie to pass. On making a perineal section, the author says: "The finger introduced through the incision found the distal end of the prostatic urethra closed and resisting all the force that could be safely applied; by means of conical bougies and forceps the channel was gradually dilated until the finger passed the obstruction, which was found to be a band of firm tissue surrounding the outer third of the prostatic urethra."

In this condition described by Belfield, a tight stricture of the prostatic urethra existed. In the condition I have illustrated no narrowing of the prostatic urethra has been found sufficient to prevent the passage into the bladder of a sound as large as the anterior urethra can take. In Belfield's case also the lesion complained of might be supposed to be a congenital one, since it occurred in a boy of nineteen years, who from his history had suffered from it as long as he could remember. The lesion I have described is apparently an acquired one, and in all cases has seemed to have been preceded by a condition of long-standing muscular spasm of the part. I have looked up Post's case, to which Belfield refers (*Boston Medical and Surgical Journal*, April 23, 1891), and which he takes to be representative of what he has called hypertrophy of the prostatic sphincter. This case of Post's certainly has nothing in common with what I have designated as chronic contraction of the prostatic fibres encircling the vesical neck, and consequently furnishes another good reason for supposing that the condition referred to by Belfield bears no relation to what I have described. In speaking of the examination of the prostate per rectum in his case, Post says: "The enlargement was slightly more prominent on one side, but perfectly smooth, and so large that the finger could not reach beyond its upper border." It is a feature of the condition I have described, that the examination per rectum shows no prostatic enlargement. In Post's case no instrument could be made to enter the bladder. There was a history of perineal traumatism in early life. On making perineal section and cutting through the hypertrophied prostate, Post says: "In hardness it resembled most closely a fibrous tumor, and as such I believe it ought to be classed."

Bangs (*Annals of Surgery*, April, 1893) has mentioned an interesting case of prostatic hypertrophy in a man, fifty-nine years old, complicated with vesical calculus and retention, in which no relief followed suprapubic cystotomy, by which the stone and projecting prostatic outgrowths were removed, but which he subsequently completely relieved, restoring also the function of micturition, by means of a perineal section and Dolbeau's dilator. The condition of rigidity of the prostate associated with senile hypertrophy has, however, no probable relation to what I have described.

REVIEWS.

RECENT WORKS ON HYPNOTISM.

TELEPATHY AND THE SUBLIMINAL SELF. An Account of Recent Investigations Regarding Hypnotism, Automatism, Dreams, Phantasms, and Related Phenomena. By R. OSGOOD MASON, A.M., M.D. New York: Henry Holt & Co., 1897.

HYPNOTISM AND ITS APPLICATION TO PRACTICAL MEDICINE. By OTTO GEORG WETTERSTRAND, M.D. Authorized Translation by HENRIK G. PETERSEN, M.D., etc. New York: G. P. Putnam's Sons, 1897.

THE general impression made upon us by Dr. Mason's book is that the author has not exercised the critical faculty which is absolutely essential in one who discusses the obscure phenomena of which it treats. The book is rather light and sketchy; it contains little original matter, and the spirit in which it deals with both the real and the alleged facts of the "borderland" of psychology is one of credulity rather than of science. Dr. Mason may not have intended it, but the tendency of his book is to exaggeration; and its effect, we think, will be to still further mystify untutored minds on subjects which for them are at best difficult of clear apprehension. He accepts the most *bizarre* cases, and occupies ulterior ground on all such subjects as telepathy, clairvoyance, and hypnotism. The author is evidently an enthusiast on the subject of the occult.

We think it opportune to call attention here to the fact that much is to-day masquerading under the garb of science that is in essence either charlatanry or wool-gathering. The rather sensational but not unintelligible phenomena of hypnotism have misled many minds—among them, unfortunately, the minds of not a few medical writers. Not only hasty generalizations, but the most deplorable extravagances in action and in writing have resulted. Dr. Mason does not sufficiently avoid these errors. We are far from imputing to him an unworthy motive; we simply judge him to be among those who occupy an advanced position of credulity rather than of common sense. That he himself considers that he is in the vanguard of "psychical researchers" is shown by his rather patronizing and expostulatory tone toward the old-fashioned scientists who decline so far to accept all the psychological fads of the day.

We think we are justified in making rather stringent criticism, and adduce one instance especially in our own defence. Dr. Mason, in his chapter on Clairvoyance, relates the case of a man who was accidentally shot in the thigh while hunting in Michigan. A protracted illness resulted, caused evidently by the retention of a foreign body in the wound. The surgical skill at hand seems not to have been adequate, for some reason, for diagnosing the case or for locating and removing this

body. The case—not the patient—was finally referred to a woman clairvoyant living in Connecticut. No details, however, of person, locality, or illness were given, except the meagre statement that a patient in a distant State had been shot. This clairvoyant, without stirring from her home, we are gravely told, “found the patient, described the wound, and declared that there was a piece of copper still in the wound.” This proved to be a copper cent, which the wounded man himself did not even know that he had been carrying in his pocket at the time of the accident! Now, we submit that an author who can believe, and expect his readers to believe, that a woman stationed in Connecticut could find and pick out by a mental process a wounded man stationed hundreds of miles away in Michigan, whom she never saw or heard of, and who, for all she knew, might be in Maine or New Mexico; and, moreover, could detect in the depth of a wound in his thigh a copper cent, which the patient did not even know that he had had in his pocket—an author who can believe this, and attempt seriously to explain it by the theory of a genuine clairvoyant power, places himself clearly outside of the range of scientific criticism. We quote the tale as a fair example of the style and flavor of the author’s book. Many other cases, quite as incredible, are scattered through his pages.

Dr. Mason believes in thought transference in the literal meaning of that term, *i. e.*, the transmission of mental influence from one person to another without the intermediation of any, at present, recognizable physical agent or channel. Space and time also are apparently annihilated in this process. He recognizes the “mind” as something apart from the physical brain, and “capable of intelligent action independent of the brain and the whole material organization through which it manifests itself.” He believes in the personal magnetization of a glass of water, and is apparently misled by the term “duplex personality” to regard this phenomenon, not as a mere affection of consciousness, but as a true exhibition of distinct “egos.” He speaks of a “subliminal self;” but what he means by it we have not been able to discover any more than we have been able to clearly understand Myers’ original definition of the term. It is apparently any and every exaltation of consciousness that poets, philosophers, inventors, and dreamers, as well as the victims of hypnotism and lunacy, may exhibit. All this, we think, does not comport with a high standard of psychological research and analysis.

Dr. Mason’s chapter on Hypnotism, which is the nearest approach to scientific writing in the book, does not do justice to the subject, because it is devoted almost exclusively to the exaggerated phases of this nervous disorder. The author himself is apparently “mesmerized” by his subject, and sees in it only wonders, mysteries, and prodigies. His object, here as elsewhere, appears, indeed, to be to excite the astonishment of the reader. We judge this tone to be due to the fact that the book is intended evidently for the lay public; indeed, it seems, from the preface, to have appeared originally in one of the New York daily newspapers. As a scientific presentation of hypnotism and allied phenomena it is an unsatisfactory work.

Dr. Wetterstrand’s book is very different, both in scope and spirit, from Dr. Mason’s. It deals very little with the theory of hypnotism, but almost entirely with its practical application. The book, in fact, is

little more than a catalogue of diseases for the cure or amelioration of which the author has practised hypnotism. It is, therefore, not especially instructive or entertaining reading, since the author almost invariably gives merely a short chronicle of the cases with a brief statement of his results. He is in the main cautious and reserved in tone, and evidently does not believe that hypnotism is a panacea—yet the personal bias in its favor is shown curiously in many places by an apparent failure to distinguish between the natural course of a disease and the effects of a remedy. This is strikingly shown when he claims that he relieved pain and procured euthanasia in a case of tubercular meningitis in a child aged seven years. When we recall the hebetude and dreamlike delirium, passing into coma, so often witnessed in this disease, it is natural to suppose that the author may have been rather too enthusiastic in his claims for the soothing effects of hypnotic suggestion. In other places it seems odd, to say the least, to read of such diseases as chronic catarrh of the stomach and diarrhoea being relieved with hypnotism. It must be said to the credit of Wetterstrand that he has a reason for his belief in every case, and his ingenious physiological and psychological explanations for the action of his remedy are not the least valuable parts of his work. As a book of practical instruction by an expert who aims evidently to avoid exaggeration, and who does not often claim to attain the unattainable, the work is a valuable one. The volume concludes with some interesting letters by Dr. Petersen, the translator, on Hypno-suggestion.

J. H. L.

GUY'S HOSPITAL REPORTS. Vol. LII. Third series, Vol. XXXVII. Edited by E. C. PERRY, M.A., M.D., and W. H. A. JACOBSON, M.A., M.Ch. London: J. & A. Churchill, 1896.

ST. THOMAS'S HOSPITAL REPORTS. New series, Vol. XXIV., 1895. Edited by Dr. T. D. ACKLAND and Mr. BERNARD PITTS. London: J. & A. Churchill, 1897.

THE opening article in *Guy's Hospital Reports* is a very interesting memoir of Arthur Edward Durham, whose active connection with Guy's covered a period of twenty-two years. While, of course, written more especially for the benefit of those who knew the subject of the article, any one reading it cannot fail to become interested in what was evidently a labor of love to the author.

Among the interesting articles are two by Frederick Taylor—one upon a case of shingles followed by paralysis of the abdominal muscles, the other upon cirrhosis of the liver in children. In the first of these, in addition to the report of a case, the author reviews other recorded cases of muscular lesions following herpes zoster. In the latter article three cases are recorded occurring in children aged thirteen, twelve, and six years, and the author discusses the relative frequency of the various forms of cirrhosis and their mutual relationship.

An elaborate article upon the urinary excretion in gout and the effect of treatment with colchicum and sodium salicylate is contributed by John Fawcett, in which the conclusions are reached that in cases treated with the former drug the amount of uric acid excreted is

variable, but usually less than the normal; that during the later days of an acute attack uric acid is usually, but not invariably, increased in amount; that after the acute attack uric-acid excretion is much reduced; that uric-acid excretion and urinary acidity do not run parallel; and that the administration of colchicum does not increase the uric-acid output. He found, however, that a rise in the excretion of uric acid followed the use of sodium salicylate.

C. R. A. Sutton, M.D., contributes an article upon albuminuric retinitis from the standpoint of prognosis and pathology. In regard to pathogenesis the author is of the opinion that poverty of the blood is the main factor in the causation of the condition, but relies for his proof chiefly upon the frequency of retinal changes in other diseases accompanied by anemia. It would seem to the reviewer that his arguments are by no means convincing.

A case of splenic anemia occurring in a child aged thirteen years is reported by Frederick Taylor; one of successful pylorectomy for carcinoma by L. A. Dunn.

The opening article in the volume of *St. Thomas's Hospital Reports* is a comprehensive and exhaustive review of the subject of osteoarthropathy, by F. Rufenacht Walters. Sixty-seven recorded cases are carefully analyzed and placed in the three following classes: 1. Typical osteoarthropathy, with bony changes and a peculiar form of clubbed fingers. 2. Cases with the peculiarly clubbed fingers alone. 3. Cases of apparent primary enlargement of the extremities and others of uncertain nature. A complete description of the conditions present in a typical case, an account of the macro- and microscopic bony changes found, and an analysis of the symptoms and signs referable to other organs and symptoms follow. The subject of diagnosis is well handled, especially in regard to the differentiation of this condition and acromegaly. One point worthy of mention is the statement that in the latter affection the nails are normal in appearance, whereas many writers state that in acromegaly both striation and fissuration are frequent. In only six of the cases analyzed was a preceding disease of the lung absent, the character of the thoracic trouble being most frequently either empyema or pleuritic effusion (18), chronic bronchitis or bronchiectasis (14), or phthisis (9). He believes, with others, that the absorption of toxins is the cause of the hypertrophic change. In the first class—that of typical cases—he analyzes forty-one cases, giving a résumé of the clinical history, the place of publication, and remarks upon the case. Twelve cases are given under his second class, or those with involvement of toes and fingers alone, while under the third division he considers twelve cases either of doubtful nature or insufficiently reported. A copious bibliography is added, with a letter from E. Legrain, of Algeria, upon the frequency of the affection in the Sahara and upon the possible bearing of the large proportion of magnesia in the drinking-water upon its etiology. The article is one of great value.

For some reason, not altogether clear, an interesting article by the late George Rainey upon "Artificial Production of Certain Organic Forms," is here reproduced from the *Medical Times and Gazette* for 1868.

G. H. Makins reports three interesting cases of injury to abdominal viscera—a traumatic cyst of the pancreas following rupture of that organ, with cure by incision and drainage; a case of rupture of the

ascending colon, with cure by laparotomy after abscess-formation; and a case of rupture of the liver, with subsequent empyema and perisplenic abscess, and death from a purely coincidental obstruction of the bowel by a Meckel's diverticulum. The report of the last case is especially instructive from the great obscurity in diagnosis and the many physical signs of peculiar distribution and significance.

F. R. Walters reports a case of pulmonary hyperplastic osteo-arthritis, the article being illustrated by excellent photo- and skiagraphs.

An analysis of autopsies performed upon children born dead or shortly dying is contributed by Robert Cory, the article being a continuation of two papers upon the same subject by the author in previous volumes of the reports.

In an instructive article by F. Foord Caiger, of the Southwestern Fever Hospital, the subject of relapse in the specific fevers is well treated. Statistics are given regarding the frequency and characters of relapse in enteric fever, diphtheria, scarlatina, smallpox, whooping-cough, r  theln, measles, and varicella. During the past year the percentage of relapse in 650 cases of enteric fever treated in the Asylum Board Hospitals was 9.8 per cent. One case of relapse is mentioned as occurring in the author's own experience, where the apyrexial period reached the extraordinary length of six weeks. A brief review of the various theories as to the cause of relapse is followed by the statement that, though he is not prepared so to state positively, the author thinks it possible that the cold-bath treatment may, with "any treatment of a repressive or abortive character," be very likely to conduce to subsequent relapses.

In regard to relapse in diphtheria, he states that among the cases treated in the Metropolitan Asylum Board Hospitals the relapse percentage was 1.4 per cent. with antitoxin, as compared with 0.9 per cent. in 1894, when antitoxin was not used. He properly holds that such a small increase in relapse percentage is no argument against the employment of antitoxin, as "it simply means that another dose or two was required to complete the protection."

Enteric fever and sewage-gas is the subject of a paper by W. Wellington Lake, based on an epidemic occurring in a home where sources other than a defective drain independent of the water-supply would seem to be eliminated as the source of contagion.

In the statistical and analytical tables of the cases treated at the hospital are many interesting and instructive case-histories. In the statistical tables of the diphtheria cases there are some interesting ratios bearing upon the use of antitoxin which confirm the results of other hospitals. It will be sufficient here to mention Table III., showing a mortality-rate of 23.42 per cent. with antitoxin as against 40.56 per cent. in 1894 without antitoxin.

The typhoid fever mortality for the year was 12.5 per cent. in 64 cases.

Among many other interesting points brought out in the statistical report might be mentioned one of acromegaly treated by pituitary feeding without specific effect, several cases of malignant disease of the pancreas, and a large number of surgical conditions valuable for statistical purposes.

The volume will serve as a model for hospital reports that may contribute to the advancement of medicine.

F. A. P.

INTERNATIONAL CLINICS. A QUARTERLY OF CLINICAL LECTURES ON MEDICINE, NEUROLOGY, SURGERY, GYNECOLOGY, OBSTETRICS, OPHTHALMOLOGY, LARYNGOLOGY, PHARYNGOLOGY, RHINOLOGY, OTOTOLOGY, AND DERMATOLOGY, AND SPECIALLY-PREPARED ARTICLES ON TREATMENT. By Professors and Lecturers in the Leading Medical Colleges of the United States, Germany, Austria, France, Great Britain, and Canada. Edited by JUDSON DALAND, M.D., Philadelphia, Instructor in Clinical Medicine and Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the Hospital of the University of Pennsylvania; Professor of Diseases of the Chest in the Philadelphia Polyclinic; Fellow of the College of Physicians of Philadelphia. J. MITCHELL BRUCE, M.D., F.R.C.P., London, England, Physician to and Lecturer on the Principles and Practice of Medicine in the Charing Cross Hospital. DAVID W. FINLAY, M.D., F.R.C.P., Aberdeen, Scotland, Professor of Practice of Medicine in the University of Aberdeen; Physician to and Lecturer on Clinical Medicine in the Aberdeen Royal Infirmary; Consulting Physician to the Royal Hospital for Diseases of the Chest, London. Vol. I., Seventh Series, 1897. Philadelphia: J. B. Lippincott Company, 1897.

DR. J. WILLIAM WHITE opens the series with a lecture on Rules Governing the Treatment of Appendicitis, which, in the main, are practical and clearly given. Incidentally, he says that pain is felt in the right iliac fossa because there is a neuritis of sufficient grade to cause tenderness on pressure. In acute inflammatory conditions the presence of true neuritis is not necessary to account for tenderness. Neuritis has a slow onset and a slow recovery not observed in early inflammatory engorgement of other tissues. While there are few disorders in which hard-and-fast rules can be applied with so little readiness as in the treatment of appendicitis, it is of value to crystallize experience, each operator for himself; and this is what has been done in the article under consideration. On page 6 the following rule is given: "In cases seen at any time after the fourth day, operation is certainly indicated whenever a firm, slowly-forming, well-defined mass in the right iliac fossa is to be felt," etc. From this portion of the rule strong dissent may be expressed. When no pitting is present, or general signs of pus-formation, the cases with firm exudate are difficult of operation and will generally recover. After the fourth day such cases are too late for early operation and too early for immediate operation; they should, therefore, if possible, be reserved for operation at a later date, when nearly all the mass of exudate will have disappeared.

The writer calls attention to the great value of the presence or absence of peristalsis as an indication for or against interference in exceedingly grave cases. The remarks on recurrent or chronic relapsing appendicitis are in general marked by intelligent discrimination. The three conclusions are worth quotation. The first needs intelligent interpretation, but is sound, viz.: "One attack of appendicitis of mild type definitely related to some dietetic or hygienic indiscretion does not of itself indicate operation." The second rule, he thinks, will admit sometimes of judicious exceptions. It is as follows: "If a first attack of appendicitis has been severe, or if more than one attack of any variety occurs, removal of the appendix should be advised during a period of quiescence." Cautious, indeed, must the surgeon be who would take the responsibility

of making exceptions to that rule. The third is stated confidently. "The persistence of local symptoms after an acute appendicitis, especially when they are associated with general ill health, indicates operation in every instance." In a brief sketch of technique the writer states the instances where, in his judgment, the appendix should not be removed at the operation.

An article by E. E. Montgomery, on "Sloughing Fibroid," is based upon a case of small submucous growth already partly extruded. A brief discussion of the general methods of treating fibroids is given. Some attention might have been devoted under the title to the dangerous cases where sloughing occurs in areas of large interstitial tumors.

Dr. E. P. Davis contributes an interesting clinical lecture upon "Tuberculosis of the Breast During Pregnancy: Acute Polyhydramnios and its Treatment." The treatment in the last-named condition consisted in emptying the uterus, with good results to the mothers in the two cases cited.

In a readable article on the "Faculty of Speech," Dr. G. Hudson Makuen illustrates by cases some anomalies of speech-organs and their operative correction. A striking case is given where excellent speech and a remarkable development of the intellect were obtained by lengthening a congenitally short genio-hyoglossus muscle in a boy of nineteen years who was supposed to be of weak mind and who could utter but four intelligible syllables.

Professor Fournier, of Paris, considering briefly the "Hypodermatic Treatment of Syphilis," reaches the conclusion that the disadvantages of this method are sufficiently great to prevent its use except in cases where the symptoms are particularly urgent, and these cases he would select with care.

T. McCall Anderson relates several cases of less common forms and modes of treatment of syphilitic affections. One of the most striking is a case of supposed Hodgkin's disease, where a large tumor of the neck and chest entirely disappeared under the iodide of potassium. A case is given of secondary syphilis treated with good immediate results by means of serum obtained from a syphilitic ward-patient who had had his initial lesion two years before. Two cases are given with almost identical lesions on the nose; one treated by iodide of potassium and calomel ointment, with good results; the other with antisiphilitic serum, Burroughs & Wellcome, but the ulcer, though healing in some places, extended slowly in others, and after two months the injections were given up.

W. W. Keen makes a suggestive plea for the use of systematic methods in case-recording and case-using, with remarks on available aids to literary work, such as card indexes, methods of filing, the use of libraries and journals. The article is worthy of a thoughtful perusal.

Practical knowledge of acute rhinitis and its treatment is none too widespread. W. E. Casselberry, of Chicago, contributes to this knowledge and indicates those measures which have value, not the least important being attention to mode of life, ventilation, and clothing.

Space does not permit a reference to many excellent lectures which adorn the volume. That form which adapts them to the audience-room makes them easier to read. While the popular style leads in some cases to discursiveness, the volume as a whole is a most creditable one, and will add to the value of the series.

G. E. S.

OM RÖNTGEN'S STRÅLAR I HJERNKIRURGIENS TJÄNST. (ON THE USE OF THE RÖNTGEN RAYS IN BRAIN SURGERY.) By S. E. HENSEN and K. G. LEXNÄNDER, Nordiskt medicinskt Arkiv., 1897. No. 30. Festival number of Axel Key.

THIS is a small reprint of a few pages, but is important from two points of view: first, in its physiology, and, secondly, in the application of physical science to surgery. The case may be briefly stated as follows: A man of thirty-three years, in good health, was wounded on August 12, 1895, by a pistol-ball in the inner angle of the left eye. The ball passed to the right and upward. The man fell unconscious, and remained unconscious for three weeks while in the hospital. The left side was anæsthetic, and it was necessary to feed him artificially. When he became conscious he was like an infant, not appreciating his situation and being able neither to speak nor to comprehend that which was spoken to him. Little by little, however, speech returned. At Christmas, 1895, he was able to go home by himself. The following August, however, marked headache in the right occipital region followed. He, therefore, re-entered the hospital of Upsala September 2, 1896. At that time he had slight aphasia, and it was difficult for him to read and write spontaneously, but he could calculate with ease. Smell was entirely gone.

The left eye, having been destroyed by the ball, was removed. The visual field of the right eye was normal, but with a slight diminution in acuity of vision toward the *inferior nasal quadrant*. Movements of the eyeball were normal and there was no hemianopic pupillary reaction. There was a slight paresis of the left side of the face and paralysis of the entire left side of the body. Hearing was good on both sides. The left shoulder was slightly paretic. The tongue deviated to the left. His gait was hemiplegic; the reflexes were reinforced on the left side.

Two skiagraphs were taken, which are reproduced in the original paper, as also are the visual fields at different times. The first skiagraph, taken sidewise, shows the ball in the occipital region, and the second skiagraph taken from behind shows the exact position of the ball to the right of the median line. Combining the two pictures, therefore, the position of the ball was determined with accuracy. An osteoplastic flap being made and the dura incised, the brain was seen to be a little darker in color at the point where it was deemed that the ball lay. Palpation showed that it was less elastic, and, on the introduction of a fine needle, at a depth of 1 cm. the ball was felt and removed through an incision in the cortex. A capsule had begun to form around the projectile. The wound was closed, and the patient made an excellent recovery and was free from his pain.

The importance of the case from the use of the Röntgen rays in locating the ball is obvious. It is the first case, we believe, in which a ball within the cranium has been shown in an adult and has been removed. Only fifteen months ago the writers of an article on the use of the x-rays in this JOURNAL, of whom the reviewer was one, believed that it would be impossible for the x-rays to show a ball within the cranium. This case shows how rapid the improvements have been.

According to the researches of M. Hensen, the fibres supplying this portion of the field come from the level of the first and second temporal convolutions. The ball, therefore, was diagnosticated as being back of this point and not far from the cortex. The operative findings confirm this.

W. W. K.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

The Use of Analgen in Infantile Therapeutics.—DR. MONCORVO, from an extensive use of this remedy, chemically known as ortho-ethoxyl-ana-mono-benzoyl-amido-quinolin, concludes that: (1) Analgen possesses a well-marked antithermic action, and is an efficacious analgesic and nervine. (2) It is harmless even with young children, who take it readily because it is tasteless. (3) In the malarial fever of children from twenty days to thirteen years of age it has undeniable efficacy. (4) It is valuable as an antipyretic in acute tuberculosis and lymphangitis. (5) In chorea, hysteria, and partial epilepsy it causes the muscular twitching to disappear and acts as a sedative. (6) It will be found useful for relief of pain of various kinds, neuralgia, Pott's disease, and tuberculosis of the hip-joint. (7) It is always well borne, not giving rise to exanthemata, adynamia, vertigo, headaches, or auditory disturbances. (8) In large doses or after prolonged use it produces a reddish-yellow color in the urine due to blood-coloring matter, but analysis fails to show either albumin or sugar. (9) The drug should be given in daily dose of from five to forty-five grains, either suspended in julep or in capsules. —*Bulletin Général de Thérapeutique*, 1896, 12e liv. p. 529.

The Superiority of Warm over Cold Baths in the Acute Diseases of Infancy.—DR. CH. FIESSINGER notes that it is not the fever which is important, but the poisoning. Here cold baths are useful in elimination; but while they may possess advantages, these may be counterbalanced by their inconvenience. The cold bath stimulates, but this stimulation weakens the organism in nervous debility. Especially in infants we note the prostration consecutive to cold bathing. This prostration which follows is further increased by the cries of the child, frightened by contact with water of low temperature. These objections do not hold as to warm baths, and it is likely that this will be the systematic bathing of the future for children, for the

lessened stimulation of the nervous system will permit it to be used as frequently as may be necessary.—*Journal des Praticiens*, 1896, No. 50, p. 790.

On Tapping the Pericardium.—MR. AUSTIN MELBOX closes his report of two successful cases by quoting West's conclusions, which he believes should be adopted by the profession. These are: (1) *Paracentesis pericardii* is not only justifiable, but an operation which may be safely undertaken with ordinary precautions. One case only is recorded in which the operation was fatal. With this exception all the patients were greatly relieved by the removal even of a small amount of the fluid, and many recovered completely who would probably have died if the operation had not been performed. (2) The most suitable place for puncture is, in ordinary cases, in the fifth left intercostal space, one inch from the edge of the sternum; but if the pleura be adherent, the puncture may be safely made much further out, and even in the sixth space. (3) The instruments employed should be a trocar and canula, with or without aspiration. (4) The operation may be performed with advantage not only in the pericardial effusions of rheumatic or primary origin, but also in those which occur in the later stages of general dropsy, if it should appear that the fluid in the pericardium is adding to the difficulties under which the heart is placed. (5) Purulent pericarditis is best treated on general principles like an empyema. (a) The pericardial sac may in these cases be safely opened and drained. (b) The treatment, moreover, appears to be the only one which offers the slightest hope of recovery. (c) The results are likely to be more favorable than those of empyema, for the walls of the cavity are better able to contract rapidly and thus permit of complete obliteration.—*Medical Press and Circular*, 1896, No. 3006, p. 622.

The Treatment of Bacteriuria.—DR. ALBERT HOGGE prefers the use of salol, which is well borne, in a minimal dose of forty to sixty grains daily. The bacteria have disappeared within three days of treatment when four or five bladder-washings with corrosive sublimate (1 to 2000) or silver nitrate (1 to 100) had failed. Local treatment, as instillations of 3 to 5 per cent. silver nitrate or 5 per cent. copper sulphate solutions, has also been found to be of less value than salol.—*Therapeutische Wochenschrift*, 1896, No. 51, S. 1269.

The Treatment of Gonorrhœa by Airol [Bismuth Oxy-iodo-gallate].

—DR. W. HOWARD makes use of the following formula: ariol, 2; distilled water, 5; glycerin, 15. Upon standing, owing to separation of the iodine, the emulsion becomes stained a yellowish color, which does not unfit it for use. Injections of two drachms, after urination, are administered twice each week. The first injection usually gives rise to a burning sensation, which completely disappears after the second or third. The injections should be retained for ten minutes. Upon the occurrence of cystitis and acute epididymitis, oil of sandalwood or salol was substituted for the injections. The fact that the former was constantly used at the same time with the injections naturally diminishes the value of the report. Of twenty patients suffering from acute gonorrhœa twelve were completely healed in a short time, while in the urine of six at their discharge tripper-fäden

were found. The number of injections varied from two to sixteen, the latter number being necessary on account of relapse brought on by the excesses of the patient. Two patients only were not so rapidly benefited: one an alcoholic subject, the other one upon whom daily injections caused severe urethral irritation. The average number of injections before the disappearance of the gonococci was 2.5, and before the cessation of the discharge 4.8. In some patients the fiden rapidly disappeared, in others the injections seemed to have but a slight influence. In chronic gonorrhœa the results are not so favorable. Of eleven patients three were speedily cured, but these presented only mild symptoms. The discharge ceased after an average of 2.6 injections. In four instances the fiden quickly disappeared; in the remainder the remedy apparently had but little influence. From these observations it may be stated that this remedy is an excellent one for checking discharge.—*Correspondenz-Blatt für Schweizer Aerzte*, 1896, No. 24, S. 753.

Senecio Vulgaris as an Emmenagogue.—MM. DALCHÉ and HEINE have used fluid extracts made from the aerial parts and the subterranean; the latter only, contains the two alkaloids senecine and senecionine. In practice it would appear that the fluid extract made from the subterranean parts was more constant in action, more rapid, and requires a smaller dose. The dose of the latter is from twenty-five to sixty drops in an ounce and a half of sweetened water; of the former the dose is one-fourth more. This remedy should be administered for different purposes, whether it is designed to relieve painful menstruation or to produce an appearance of the flow. When used to soothe the pain which precedes, accompanies, or follows the appearance of the flow it was found to possess some action upon the uterus and adnexa, even if they are diseased, although relief of the dysmenorrhœa occurring with metritis or peri-uterine inflammations is much less marked. When this drug has been given for the relief of amenorrhœa only failures have been met with. On the other hand, when dysmenorrhœa has been treated by the drug, successfully or otherwise, it was noted that twice the flow was slightly increased in amount, six times diminished, and ten times it was normal in quantity. In general, action of the drug seems to leave the amount of flow either normal or lessened rather than to increase it, and this probably explains the failures in amenorrhœa. So far as concerns other organs of the body, it does not appear to have any analgesic effect. On the other hand, its administration has not been followed by untoward effects. So far as may be decided from the results obtained from its administration to domestic animals, therapeutic doses of the fluid extract do not cause poisoning (by accumulation) nor abortion; yet the usual rules of prudence must not be neglected when it is given to women who may be presumed to be pregnant.—*Les Nouveaux Remèdes*, 1896, No. 23, p. 697.

The Use of Amylene Hydrate in Diabetes Insipidus.—DR. H. BRACKMANN states that this drug is considered to be so entirely hypnotic in its action that its property of modifying secretions has been entirely lost sight of. Scharschmidt alone notes that some patients perspire at the commencement of its use. In the single instance reported an evening dose of fifty grains diminished the thirst, lessened the quantity from 230 to 100 ounces,

and raised the specific gravity from 1005 to 1011 in six days. On the omission of the remedy the symptoms returned.—*Therapeutische Monatshefte*, 1896, Heft xii, S. 641.

Treatment of Infectious Pneumonia by Cold Compresses.—DR. KLEIN describes the method as follows: A napkin large enough to reach from the top of the sternum to the stomach and cover the anterior and both lateral surfaces of the chest is dipped in cold water at a temperature of 46° to 50° F. and applied to the chest. At the end of five minutes it is replaced by a cold one, and this treatment is continued for an hour. After a half-hour's rest three similar series are carried out. Two instances of their use are reported. He explains his results by the stimulation of the nervous and muscular systems. The dyspnoea is relieved because, with the deeper respiration, it becomes slower. Inasmuch as the treatment seems to be free from danger and is acceptable to the patients, it should be made use of.—*Bulletin Général de Thérapeutique*, 1897, 6e liv. p. 270.

Ten Years' Experience with the Cold-bath Treatment of Typhoid Fever.—DR. F. E. HARE reports that the mortality in 1828 cases treated during the expectant period of five years was 14.8 per cent. Following this came the period of cold bathing, 1902 cases, with a mortality of 7.5 per cent. Of the 143 fatal cases in the last series, 56 died from perforation, 23 from hemorrhage, and 64 from other causes. In comparison with the expectant treatment we may say that perforation and hemorrhage, which together used to cause only about one-fourth of the total deaths, now under the bath-treatment cause more than half. This series of cases under consideration includes all which could fairly be called typhoid, save 23 under treatment. It includes, therefore, many that were not bathed at all, because such treatment was contraindicated; many more were not bathed because the pyrexia was insufficiently high to require it; many that were hopeless on admission; some that died from old-standing or intercurrent disease during the course of an attack of typhoid, and some that were only determined to be typhoid by the necropsy.—*The Australasian Medical Gazette*, 1897, No. 186, p. 111.

[So far as this report shows anything, it indicates that cold-bathing has not reduced, to say the least, the mortality from the two great dangers of typhoid fever—perforation and hemorrhage.—R. W. W.]

Puerperal Septicæmia Treated with Nuclein.—DR. HENRY M. JOY considers that the surgical treatment should remove or limit, so far as is possible, the source from which the toxic elements are supplied to the blood, and the medical should aid nature in her efforts to overcome the poisons already in the system; that is to say, to increase the antitoxic constituents of the blood or to strengthen those constituents which are already present. One instance of the use of a 5 per cent. solution of nuclein, given in drachm doses every three hours, is reported. Douches were also given daily by the nurse. There was no recurrence of the chills after the second day, although the temperature remained approximately the same for six days, when the crisis occurred. Although during this time there was little variation in the height of the temperature, the daily remissions were marked and the pulse

continued to fall steadily and to improve in quality, the general condition being one of progression. The patient's mental condition changed rapidly for the better, the appetite returned, and the skin resumed its normal color. Nuclein evidently strengthens nature's antitoxic elements in acting promptly and favorably upon leucocytosis, causing no unpleasant complication or effects, and rapidly diminishes fetid discharges.—*Therapeutic Gazette*, 1897, No. 5, p. 296.

Chelidonium Majus in the Treatment of Cancer.—DR. C. D. SPIVAK has collected the reported cases of fourteen observers, and finds that of 61 treated, 33 improved under this treatment. The general sentiment, based upon the favorable cases reported by reputable physicians and the microscopical examinations of cancerous tissue made after the injections, is that (1) the drug undoubtedly has some influence upon cancerous tissue which requires further investigation; (2) the experiments are not numerous enough to warrant definite conclusions, (3) the drug being very unstable, many of the unfavorable cases may be attributed to the inefficiency of the preparation; and (4) probably the technique of the administration is not yet perfected.—*Therapeutic Gazette*, 1897, No. 4, p. 229.

The Causation of Chloroform Syncope.—MR. LEONARD HILL concludes that: (1) Chloroform produces a primary failure of the circulating mechanism and a secondary failure of the respiratory centre. The respiratory centre fails to act not only because it is damaged by the drug, but because of the anæmia of the spinal bulb produced by the fall of arterial tension. This is proved by the fact that the action of the respiratory centre can be renewed by raising the arterial tension. The depth of anæsthesia depends, as does the paralysis of the respiratory centre, on the primary fall of the arterial tension. (2) It, more than any other known agent, rapidly abolishes the vascular mechanisms which compensate for the hydrostatic effect of gravity. (3) It abolishes these mechanisms by paralyzing the splanchnic vasomotor tone and by weakening the action of the respiratory pump. When these mechanisms are totally abolished the circulation is impossible if the subject be in the feet-down position. (4) It also produces paralytic dilatation of the heart. It acts directly like amyl nitrite on the musculature of the whole vascular system. (5) There are two forms of chloroform syncope: (a) During primary anæsthetization. The patient struggles, holds his breath, raises the intrathoracic pressure, congests his venous system, lowers his arterial tension, and finally takes deep inspirations and surcharges his lungs with chloroform. In the first stage the left heart becomes impoverished; in the second stage it is suddenly filled with blood. This is drawn from the lungs, and is full of chloroform. The chloroform passes into the coronary arteries, and the heart is thrown into paralytic dilatation. Respiration and the pulse either cease simultaneously, or the pulse before respiration. (b) During prolonged anæsthesia this arises from gradually giving chloroform to too great an extent. The arterial pressure falls lower and lower, and, secondarily, the respiration ceases because of the anæmia of the spinal bulb. The heart is not in this case paralyzed by chloroform, because the drug is taken in gradually by the shallow respirations and distributed slowly by the

feeble circulation. (6) Artificial respiration and the assumption of the horizontal position, if applied in time, will always resuscitate a patient from the second form of syncope. (7) Artificial respiration, established with the patient in the horizontal posture, is also the treatment indicated in the first form of syncope; the heart should be rhythmically compressed by squeezing the thorax. If this does not quickly renew the pulse, the patient should be put into the vertical feet-down posture. The dilated right heart is thereby completely and easily emptied of blood. Artificial respiration is maintained during this manœuvre, and the patient is brought once more into the horizontal posture. By rhythmic compression of the chest an efficient circulation is maintained through the coronary arteries; by first emptying and then filling the heart a fresh supply of blood is brought into that organ. If this does not prove successful on the first trial it can be repeated. (8) Inversion—that is, placing the subject in the feet-up position—or compression of the abdomen will increase the paralytic dilatation of the heart. In this kind of syncope both these forms of treatment are worse than useless. (9) In the condition of shock or emotional fear the compensatory mechanism for the effect of gravity is almost abolished, and chloroform may easily be the last straw to completely paralyze the circulation. (10) Vagus inhibition of the heart is of no importance as an agent in the production of chloroform syncope. (11) Ether is in every respect a far safer anæsthetic than chloroform. According to Ringer's experiments on the heart, ether is fifty times less dangerous than chloroform.—*British Medical Journal*, 1897, No. 1894, p. 957.

The Treatment of Chronic Alcoholism by Strychnine.—DR. F. COMBE-MALE regards as the capital indication for its use the period of alcoholism without acute attacks. If there is an acute attack imminent, opium will prevent it, and strychnine then becomes useful in warding off another and in conducing to a complete cure. There are, however, instances when the drug cannot be used without adding an acute to the chronic poisoning. If there is marked fatty degeneration, a premature senescence of the tissues, failure of mental functions, an arcus senilis, or cardiac degeneration, the tissues cannot be regenerated by this drug. Further, if the organs of elimination do not act normally, there is danger of accident in its use.—*Gazette Hebdomadaire de Médecine et de Chirurgie*, 1897, No. 39, p. 457.

A Case of Susceptibility to Caffeine.—M. DALCHÉ reports that a diabetic suffering from a secondary grippal pneumonia received four hypodermatic injections of a grain each in a day. As a result, there appeared agitation, loquacity, delirium, vomiting, cutaneous and muscular hyperæsthesia. Coma threatened, but there was no acetone or diacetic acid in the urine. The drug being omitted, all symptoms disappeared. There was a previous history of hysteria. Renal insufficiency was not brought in to explain these symptoms, but they were attributed to idiosyncrasy.—*Les Nouveaux Remèdes*, 1897, No. 7, p. 198.

Treatment of Spider-bites.—DR. A. DAVIDSON believes that most of the so-called spider-bites encountered in Southern California are inflicted by an

insect called the pirate-bug (*Rhasahus biguttatus*, Say), which is common in some periods in orchards, and may be found in streets and about dwellings, being attracted by the lights. The treatment of such wounds is the application of corrosive sublimate in solution (1 to 500 or 1000), locally, and keeping the necrotic part bathed in this.—*Therapeutic Gazette*, 1897, No. 2, p. 80.

A Case of Copaiva Poisoning.—MR. WILLIAM H. THOMPSON was called to see a young man, aged twenty-six years, on account of a rash which he had first noticed two days previously. He had been treated by a chemist for gonorrhœa for three weeks, during which time he had taken three capsules daily, each capsule containing (as was afterward ascertained) 10 minims of oil of copaiva. At first sight the patient looked as if he had measles, the whole of his face and neck being covered with an elevated, bright red rash. The face and eyelids were also much swollen. On further examination the rash, which disappeared on pressure, was found to cover his chest, abdomen, and upper and lower extremities. His skin was very irritable, and the scratches, which were numerous across his chest, bore evidence to the great amount of itching, of which he greatly complained. There was a very disagreeable odor about the patient, which he himself had not noticed. His temperature was 97.2°, pulse 110; urine of specific gravity 1030, no albumin, no sugar. On discontinuing the capsules the patient gradually improved, although the rash was evident on the anterior aspect of his thighs seven days later.—*British Medical Journal*, 1897, No. 1887, p. 522.

Excessive Urobilinuria Following the Administration of Trional.—DR. ROLLESTON reports that a woman, aged fifty-seven years, who had suffered from dropsy, jaundice, and progressive shortness of breath, was found to have a dilated heart and slight œdema. There were also purpuric patches on the thorax and abdomen. The urine was high colored, but contained no bile nor albumin. On the first, sixth, and eighth evenings after admission twenty grains of trional were given. At the last dose the urine became of a deep orange color, and upon dilution the spectroscope showed a well-marked band of urobilin. The peculiar color, which became gradually lighter, remained until her death from exhaustion eight days later. Four days before death she became delirious and her temperature rose. At the necropsy a localized empyema between the lobes of the right lung, a dilated heart, and a non-cirrhotic nutmeg liver were found. It appeared probable that the patient had been subject for some time to a urobilin jaundice due to the purpuric patches and the nutmeg liver, and that this condition was increased by the administration of the drug.—*British Medical Journal*, 1897, No. 1890, p. 719.

Antipyrin Poisoning.—DR. SCHEEL reports that a woman, aged fifty years, took a nostrum containing about seven grains of this drug. After an hour there followed marked swelling and redness of the upper lip; three hours later there were noticed pain and tears in the eyes, paralysis, swelling, and smarting of the tongue. Speech was difficult and disturbed by salivation. An hour after this came chilliness and sensations of heat; still later there supervened syncope, vomiting, and diarrhœa. The next morning there

was found an eruption upon the face; the next day on the lower arms, hands, and thighs, which resembled scarlet fever. There was marked burning and itching about anus and vulva. The face was swollen, especially the lips and eyelids, also the tongue and gums were swollen, painful, and coated. The following day the eruption extended over the whole body. The next morning herpes appeared upon the lips, chin, and anterior surface of the neck. These symptoms gradually disappeared within the next fortnight, although great weakness persisted. Severe desquamation closed the history of this decidedly unique case.—*Thérapeutische Monatshefte*, 1897, Heft 3, S. 161.

Poisoning by Pyrethrum.—DR. BOSREPOX reports that a child of eleven months opened a box of this substance in powder and covered his face with it. Then followed pallor, vomiting, slowing of the heart-beats, and agitated respiration. Cure followed the administration of ipecacuanha.

DR. FERRAND notes that it is difficult in this case to separate the asphyxia from mechanical obstruction of the respiratory passages produced by the powder from the symptoms resulting from the irritant and toxic properties of the drug.—*Revue de Thérapeutique*, 1897, No. 6, p. 187.

Bismuth-poisoning.—DR. AMÉDÉE DUBREUILH reports that a man of thirty years, horse-car conductor, of usual good health, three times in eight years has suffered from an intense generalized scarlatiniiform eruption lasting five days, and followed by desquamation, after having taken thirty to forty grains of bismuth subnitrate in a gum emulsion with syrup of quince, which had been prescribed for a severe summer diarrhoea. This idiosyncrasy has never been noted before, and that is the probable explanation. But it is well to remember that infectious erythematata followed by desquamation occur in the course of entero-colitis, enteric fever, and cholera, and possibly might occur in a severe summer diarrhoea. Poisoning by bismuth from external applications has not been recorded. Villejean, by subcutaneous injections, produced stomatitis, erosions with sloughing, albuminuria, enteritis with bloody stools, and slight hepatic congestion. On the other hand, Matthieu gave a dyspeptic fifty ounces of bismuth subnitrate in eighty days without producing unfavorable symptoms. The drug, however, is very slightly soluble in the gastric juice, and in this case the eruption should be attributed either to a reflex from the gastric mucous membrane or to an idiosyncrasy rather than to failure of elimination of a drug which is with such difficulty absorbed.—*Bulletin Général de Thérapeutique*, 1897, 8e liv. p. 229.

Roentgen Rays.—DR. H. KAPOSI showed a patient at the Vienna Dermatological Society upon whom exposure to these rays caused the hairs of an extensive nevus pilosus to fall out. For about fourteen days there was an erythematous inflammation, which, however, did not cover all portions acted upon by the rays. It was suggested that the action of the rays, as in insolation, was to be attributed to the chemical influence of the ultra-violet rays, which cause hyperæmia and later a lasting paresis of the bloodvessels. While the rays of the sun act more upon the superficial vessels, those of Röntgen act upon the deep-lying vessels of the hair-papillæ and of the sebaceous follicles. Therefore it was believed that when the bloodvessels recovered

their normal tone, normal production of hair would take place. This belief proved to be true, and the hair has reformed, although there was extensive gangrene, due probably to alteration in the albuminous substances of the tissues.—*Wiener klinische Wochenschrift*, 1897, No. 16, S. 383.

Lead-poisoning.—DR. MANNABERG observed six instances in one family, all presenting the blue line upon the gums, severe anæmia, muscular weakness, colics, and in some were found hard arteries, interference with intestinal digestion, and neuritis. An investigation showed that the source of the poison was papikra, which had been purchased cheaply to the amount of two pounds each month. Whether the lead was in the form of minium [lead oxide (red)] as a sophistication should be determined by chemical analysis.—*Münchener medicinische Wochenschrift*, 1897, No. 14, p. 375.

The Treatment of Uterine Carcinoma by Chelidonium Majus.—DR. A. DUEHRSEN reports the failure of this remedy in a case in which the diagnosis was established by the microscope. Nineteen parenchymatous injections were made of equal parts of extract of celandine, glycerin, and distilled water, and, in addition, within a month, two ounces of the extract were given by the mouth. The treatment was without effect, and at the last report the patient was near to her death. The author warns against the use of such remedies, because in this way the time of operation may be delayed until it is impossible, and he believes that the only sure remedy against cancer is the knife of the surgeon.—*Deutsche medicinische Wochenschrift*, 1896, No. 49, S. 787.

M. ROBINSON reports the successful use of this remedy in one instance of cancer of the left upper jaw. The patient was under observation nine days, expressed herself as satisfied with the relief afforded, and anxious to continue treatment, and then was lost sight of. The author concludes that this drug seems to have a specific action upon cancerous tumors. The vigorous reaction which follows its use bears a certain resemblance to that of tuberculin.—*Bulletin Général de Thérapeutique*, 1896, 21e liv. p. 660.

[Apparently there was no microscopical examination made, and whatever may have been the result of the treatment, the explanation should be based upon the caustic properties of the drug.—R. W. W.]

Treatment of Psoriasis with Cacodylic Acid.—DR. DAULAS reports the successful use of this substance upon a man, aged forty-six years, who had suffered from this disease for twenty-six years. For the past six years he had received all forms of treatment, but without other treatment than this the disease retrograded, the exfoliation was less marked, the redness disappeared, and the thickening of the skin was lessened. The patient became paler, but did not lose flesh. The formula is: Cacodylic acid, 5; rum, 40; syrup of orange-peel, 40; distilled water, 120, with oil of peppermint for flavoring. Six teaspoonfuls of the mixture were taken each day for three weeks, when four were found to be sufficient. Beyond an odor of garlic in the breath and slight gastric disturbance at the third week, no untoward symptoms were noted.—*Therapeutische Wochenschrift*, 1897, No. 22, p. 560.

MEDICINE.

UNDER THE CHARGE OF

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A Severe Case of Abdominal Typhus Associated with Suppuration of the Gall-bladder.—ALEXIEEF reports, in the *Journal Dietskaya Meditzina*, 1896, No. 4, the following case: Flora M., aged five years, was taken on November 5 with chill and tenderness in glands on both sides of the neck, which diminished under treatment by ointment of iodide of potassium.

On the 11th the glands under the left sterno-mastoid began to enlarge, reaching the size of a hen's egg on the 13th. They supplicated, and on operation on the 18th a tablespoonful of white pus was removed. Though the patient for the first day or so seemed better, the temperature continued to rise gradually; after the 21st continued fever. On the 29th the spleen had become readily palpable. There was no apparent cause for the fever, the wound healing well. From this time on the fever remained almost continually above 39° C. The first week in December a roseola was made out on the chest and back. There was cough, with dry râles. The liver was outlined a little below the costal margin. During the second week in December the patient became very drowsy and was delirious; there was tenderness in the ileo-caecal region. The râles at the bases more numerous; considerable expectoration; the roseola diminished, but still present. During the third week in December the patient became markedly worse, complaining of pain, especially in the right side of the abdomen. When lying on her back there was to be made out, four or five fingers' breadths below the costal margin on the right side, a rounded tumor about half the size of a small hen's egg. On percussion the tumor was pear-shaped, and the dullness was continuous with that of the liver. There was marked motion with respiration; it was elastic and somewhat tender on palpation. Distinct fremitus was found to be present on palpation between the 18th and 20th. Diarrhoea. The urine by this time had begun to contain a trace of albumin. On the night of the 20th and 22d the patient became much worse, complaining of great abdominal pain. Finally she became greatly excited, jumped out of bed; did not recognize those about her. She became very feeble and collapsed. Temperature 36.6° C.; pulse uncountable. Tinct. valer. aeth. was given hypodermatically; by the following morning she became somewhat calmer. At this time the tumor, which had been palpable the day before, was no longer to be made out. The abdomen was much distended and tender. The bowels moved only by enema.

On the 25th patient was worse, complaining of severe pain in the right side; abdomen much distended; everywhere tender. Cries out with pain.

There is no jaundice. From the 29th to the 31st the temperature was somewhat lower, but the patient seemed much worse; lies on her back or on the right side, with the knees drawn up; can take no other position. The abdomen, especially on the right side, is distended and very tender. The outlines of the tumor, which were formerly made out, are not to be distinguished.

A diagnosis of cholecystitis or suppuration in the neighborhood of the gall-bladder was made and operation advised. This was performed on the 21st, an incision 9 cm. long, parallel to and two fingers below the costal margin on the right side, being made. On opening the abdominal cavity a serous fluid, colored with bile, escaped. The intestines were adherent; there was pus in the gall-bladder and surrounding it, suppuration having extended also into the praegastic area. The pus was emptied, drainage established, and the cavity packed with iodoform gauze. After the operation the patient was excessively weak, and 20 c.c. of salt solution was introduced hypodermatically.

The fluid obtained was examined by Dr. V. A. Kolli. It was an orange-colored fluid consisting of two layers: an upper, transparent and yellow; the lower, cloudy and whitish.

(1) *Microscopical Examination.*

(a) In fresh preparations there were masses of pus-corpuscles for the greater part in a condition of fatty degeneration, and finely granular detritus and a moderate number of red blood-corpuscles, and short, rapidly movable bacteria, about 2 to 4 mm. in length. Besides these there were masses of yellow pigment.

(b) In preparations colored by gentian-violet or methylene-blue the same picture was made out; the bacilli were colored sufficiently sharply. On staining by Ziehl-Neelsen's stain tubercle bacilli were not made out.

(2) *Bacteriological Examination.*

(a) Cultures on meat-peptone-glycerin agar at 38° C. gave in twenty-four hours only small colonies of a single variety of a bluish-gray color; under the microscope slightly granular. These colonies consist of short rods, 2 mm. long, possessed of rapid motion. On coloring by Gram's method the bacilli lose their color.

(b) With these bacilli inoculated upon sterilized milk during forty-eight hours at 38° C. they did not coagulate; in the control experiment inoculated with pure cultures of the bacillus coli communis the milk coagulated in twenty-four hours.

(c) Meat-peptone-gelatin, plus 1.5 per cent. grape-sugar, inoculated with the above-mentioned bacteria did not show any sign of gas formation (in control experiment with the bacillus coli communis there was a formation of gas).

(d) Cultures on cooked potato did not change the appearance of the surface. From the time of infection of the first gelatin and agar no new cultures appeared seventy-five hours after the inoculation. He concludes, as a result of all these studies, that they are justified in assuming that this bacillus which was found in the contents of the gall-bladder in pure culture was the bacillus typhi abdominalis.

After the operation the temperature was practically normal. The child

improved very much; the spleen was no longer palpable on the 13th of the month, and during the first week in February the temperature was normal and the patient began to walk about the room. From February 9th, however, without apparent cause, the patient's temperature began to rise and the condition became worse. By the 15th the child had become drowsy and dull and weak; the abdomen was distended; the spleen was palpable; there was delirium. During the next several days the diazo-reaction was present in the urine. The temperature, however, began to fall, and by February 21st was normal. During all this time the discharge in the healing of the wound had gone on satisfactorily. The discharge consisted of bile mixed at times with a little pus. On the 24th the discharge had stopped and the spleen was no longer palpable. By March 1st the patient was out of bed again.

From March 13th to the 17th the patient had a slight attack of pneumonia in the right lower lobe, from which, however, she recovered.

On March 26th the patient was well, up and about, and the wound entirely cicatrized.

The author believes that on the night between December 21st and 22d, when the patient had such severe abdominal pain and collapsed, the gall-bladder ruptured. He believes that the second attack of fever was a true relapse, though remarkably late in onset.

The patient's mother was ill at the same time with typhoid fever, dying in a relapse. He inclines to think that the lymphadenitis was an entirely separate affair, the complication of the two processes being wholly accidental.

Chronic Joint-disease in Children.—STILL (*Medico-Chirurgical Transactions*, 1897) published an interesting article on a form of chronic joint-disease in children which hitherto has not been generally recognized. While acknowledging that rheumatoid arthritis occasionally occurs in children, the writer believes that the disease which has most commonly been called rheumatoid arthritis in children differs both in its clinical aspect and in its morbid anatomy from the rheumatoid arthritis of adults. It presents differences sufficiently marked to suggest that it has a distinct pathology.

Still's article is based on a study of twenty-two cases, nineteen of which came under his personal observation.

The disease which Still studied is defined as a progressive enlargement of the joints, associated with general enlargement of the glands and enlargement of the spleen.

The onset is almost always before the second dentition; ten out of twelve cases began before the age of six years, and of these eight began within the first three years of life. The earliest was at fifteen months.

Girls are more commonly affected than boys. Seven of the twelve patients were girls; five were boys.

Onset is usually insidious. The child, if old enough, complains of stiffness in one or more joints, which slowly become enlarged, and subsequently other joints become affected. Occasionally the onset is acute, with pyrexia, and, it may be, with rigors.

The enlargement of the joints feels and looks more like general thickening of the tissues round the joint than a bony enlargement, and is correspondingly smooth and fusiform, with none of the bony irregularity of the rheu-

matoid arthritis of adults. There is an absence of osteophytic growth and of bony lipping, even after the disease has existed for years.

There is never any bony grating, although creaking, probably either of tendon or of cartilage, is frequently present. There is no redness or tenderness of the joints, except in very acute cases. Pain is generally absent, but it may be present in a slight degree, especially on movement. Limitation of movement, chiefly of extension, is almost always present. The child may be completely bedridden, owing to more or less rigid flexion of the joints.

The most common deformities of the hand consist of flexion of the wrist, with slight deviation of the hand to the ulnar side, and slight flexion of the proximal combined sometimes with slight flexion of the distal interphalangeal joint. The fingers may deviate very slightly to the radial side, but more often the deviation is at the proximal interphalangeal joint, and may be to either side. Deviations in both directions may be seen in the same hand.

The joints earliest affected were usually the knees, wrists, and those of the cervical spine, the subsequent order of affection being ankles, elbows, and fingers. The sterno-clavicular joint was affected in two out of twelve cases; the temporo-maxillary in three. The affection is symmetrical. There is no tendency to suppuration or bony ankylosis. The muscles moving the involved joints show early and marked wasting.

The electrical reactions showed nothing beyond a brisk response to the faradic and galvanic current in three cases.

The most distinct feature of the disease is the affection of the lymphatic glands. The enlargement is general, but involves primarily and chiefly those in relation to the involved joints. The glands are separate, rather hard than soft, not tender, and show no tendency to break down. They may become so large as to be visible, but more often do not become larger than a hazelnut. The enlargement seems to bear a definite relation to the progress of the disease in the joints. Slight affection of the glands is found very soon after the first symptoms of the joint affection, and as the latter increases the glands become larger. If the joint-affection subsides, the glands become smaller, increasing again in size if the joints become worse.

The glands most affected are the supra-trochlear, those along the brachial artery, and those in the axilla. In addition, those in Scarpa's triangle and deep in the iliac fossa along the iliac artery and those in the posterior cervical triangle are also involved. In one case the popliteal glands were enlarged, and in two cases there was evidence of enlargement of the mediastinal glands. Enlargement of the mesenteric glands was not made out, but in one autopsy the gland at the hilum of the spleen was enlarged.

The glandular enlargement may be said to be general and constant. It was present in all the twelve cases mentioned.

Splenic enlargement was also a striking feature. In nine of the twelve cases the edge was felt one or two fingers' breadths below the costal margin. The spleen was observed to increase or diminish according as the joints became worse or improved.

There was no evidence of organic heart-disease, although hæmic murmurs were present in some of the cases.

There were signs of adherent pericardium in two of the cases, and in three other cases adherent pericardium was found quite unexpectedly at autopsy.

Moderate anæmia was present in some of the cases, and in four out of the twelve moderate exophthalmos. Sweating was often profuse.

The temperature was of two varieties. One variety shows periods, generally lasting only a few days, of pyrexia followed by longer intervals of apyrexia; the other shows more or less continuous slight pyrexia.

There is a general arrest of development when the disease begins before the second dentition, the arrest being of bodily and not of mental development.

The course of the disease is slow. Improvement may occur for a time under treatment or spontaneously, but the disease soon progresses again until a condition of general joint-disease is reached, which seems to be permanently stationary. The disease is not in itself fatal.

The morbid anatomy of this disease was studied in three autopsies.

Still concludes from a study of these cases "that there is a disease occurring in children before the second dentition which is characterized clinically by elastic, fusiform enlargement of joints, without bony change, and also by enlargement of the gland and spleen."

The disease has hitherto been called rheumatoid arthritis, but it differs from that disease in adults clinically in the absence of bony change even when no disease is advanced, and in the enlargement of glands and spleen, and pathologically in the absence, even in advanced cases, of the cartilage changes which are found quite early in that disease, and also in the absence of osteophytic change.

These differences are not to be attributed merely to modification of the disease by difference of age, as there occurs also in children a disease in every respect identical with the rheumatoid arthritis of adults.

Under the head of rheumatoid arthritis in children at least three conditions have been confused, which are both clinically and pathologically distinct, namely: (1) The joint-disease described in the present paper; (2) a disease identical with rheumatoid arthritis of adults; (3) a disease probably identical with that described by Jaccoud as chronic fibrous rheumatism.

It is rather remarkable that the writer made no reference to tuberculous or syphilitic joint lesions and did not attempt to differentiate the disease he described from these affections.

Primary Carcinoma of the Pleura.—BENDA (*Deutsche medicin. Wochenschr.*, 1897, No. 21, S. 321) records a case of primary carcinoma of the pleura on which he performed an autopsy in September, 1895.

The patient, a workman, aged fifty-four years, was admitted to the hospital at Bethanien in December, 1894, ten months before death. For one year previous to admission he had complained of pain in the left side of the chest, and one month before admission the left pleural cavity was aspirated and three litres of fluid removed. A marked left-sided pleural exudate existed on entering the hospital. Patient was well-nourished, free from fever, urine free from albumin, and there were no special symptoms to arouse particular interest. The case was considered one of simple pleural exudate. Up to June, 1895, sixteen aspirations had been performed, large quantities of clear serous exudate, free from any formed elements, being removed on each occasion. The patient then left the hospital at Bethanien, and six

weeks later was admitted to the surgical ward of the hospital at Urban. As the patient was very anxious to have an operation performed, a rib was resected, revealing an extensive tumor connected with the pleura. Sections made from a portion of the tumor removed at the operation showed it to be carcinomatous in character. After the operation there was an abundant exudate in the left pleural cavity, which was at first serous. Fourteen days after the operation fever set in and the exudate became purulent. The patient died four weeks after the resection of the rib, with symptoms of pyæmia.

The autopsy showed that the immediate cause of death was due to the occurrence of an empyema of the left side, with metastatic abscess in the kidneys and skin. The pleural exudate showed the bacillus pyocyaneus and streptococci, although the latter were not found in the cultures. The abscesses contained chiefly bacilli. Otherwise the organs were normal with the exception of the left pleura, which presented an extensive tumor formation. The entire pleura, pulmonary, costal and diaphragmatic, was studded with nodular masses scarcely reaching a cherry in size, with a tendency for them to become matted together, particularly at the apex of the lung. Adhesions between the pleural layers, with carcinomatous infiltration, were present at various points. The youngest tumor-masses resembled cardiac vegetations in appearance. The left lung showed areas of atelectasis due to compression, with a few abscesses, but no tumor nodules. The nodules were everywhere for the most part superficial. Only occasionally did a nodule tend to invade the lung. Some of those in the diaphragmatic pleura invaded the muscular tissue to a moderate degree. The mediastinal glands were enlarged, pigmented, but were free from tumor nodules. No growths were found in any other part of the body.

Microscopical examination showed the tumor to be made up of cells epithelial in type and a stroma. These were arranged so as to produce two different pictures according to the situation. Superficially they were so arranged as to resemble villi, showing a strong resemblance to the papillary formations in certain ovarian cysts. Here the cells were of a long, cylindrical type. In the deeper portions the cells were distributed so as to form columns, or in many places definite alveoli.

An interesting feature was that there was a gradual transformation in shape of the superficial endothelial cells to the tumor cells of a definite cylindrical form.

Orth, Ziegler, Seeliger, and recently Hanseemann have stated that they believe the tumors of the serous cavities resemble the carcinomata more closely than the endotheliomata, but none of them, according to Benda, have recorded cases in support of this view. Benda claims that his case fills this gap, because at many points a definite transformation from the superficial endothelial cells to those of a typical carcinomatous type could be made out.

Diagnosis of Carcinoma Duodeni.—CZYGAN (*Archiv für Verdauungskrankheiten*, vol. iii. No. 1) reports a case in which a cancer involved the duodenum from 1 cm. below the pylorus to within about the same distance of the ductus choledochus. The following data led to a correct diagnosis intra vitam: 1. The very high nitrogen excretion pointed to malignant

disease; that is, to the carcinomatous nature of the tumor. 2. The great dilatation of the stomach made it probable that the obstruction was at or near the pylorus. 3. The free and combined HCl and the marked coagulating power of the stomach-contents made it probable that the stomach itself was not involved. There was splashing between the tumor and the liver, probably in the beginning of the small intestine. 4. The absence of leucin, tyrosin, and bile from the stomach-contents, and the absence of icterus, made it likely that the tumor was between the pylorus and the ductus choledochus.

An Uncommon Form of Pigmentation of the Skin in Addison's Disease.—TREBITSCH (*Zeit. f. klin. Med.*, 1897, Band xxxii. S. 163) reports a very interesting case of Addison's disease, with an unusual form of pigmentation of the skin. He refers briefly to the fact that involvement of the suprarenal glands is not constant in Addison's disease. The splanchnic nerves and sympathetic ganglia are diseased in a certain percentage of cases.

One of the most striking features of the disease is the pigmentation of the skin. The pigment is undoubtedly hæmatogenous in origin, but, as yet, the true cause of its deposition is not definitely known. When the pigmentation first appears it is either in the form of a diffuse bronzing of the skin or occurs as discrete patches, the former being the commoner. In either case those parts which are most exposed to the light and air and those situations where normal pigment is most abundant show the pigmentation most marked. Although the bronzing may be patchy at first, yet it is quite rare for the pigmentation to remain patchy throughout the course of the disease. He reports a case in which this feature persisted until death occurred.

The patient, male, aged twenty-one years, was admitted to the clinic on May 18, 1896, and died on May 20th. It was impossible to get a history from the patient himself, but an attendant gave the following account of the patient's illness:

For a few months he had gradually emaciated and complained of lassitude. Had never complained of pain. During the last few weeks small, dark patches of pigment appeared on the skin, especially on the face.

On admission patient's temperature was 36.2° C., pulse 120, respirations 20. He lay quietly on his back in a condition of stupor, and gave incoherent answers or none at all to questions asked.

The general color of the skin was a pale yellow, with a tinge of brown, the tinging being more marked on the face and hands than on the body. The face presented numerous light-brown to blackish patches, some of which were punctiform and others as large as millet-seeds. These were found everywhere on the skin of the face, and also on the eyelids, but not in the conjunctiva. The sclerotics were free from pigment. The pigmented areas were situated in the superficial layers of the skin, and there was no thickening to be made out in these situations. They were very clearly outlined from the surrounding skin.

Similar patches were present on the thorax and legs, but were larger and not so close together.

The pupils were of moderate size, equal, and reacted to light and accommodation. Fundus of the eye was normal. Visible mucous membranes were pale. The lips showed more or less confluent areas of pigmentation.

The hard palate presented a similar appearance, but the soft palate and pharynx showed no abnormal pigmentation. There was pigmentation of the inner side of the right cheek, extending as far back as the teeth on that side. There was no pigmentation of the laryngeal mucous membrane, matrix of nails, scrotum, penis, anal folds, or axillæ.

Thyroid gland was not enlarged. Radial pulse was almost imperceptible; expansion very slight; vessel wall soft.

There was nothing of note in the examination of the lungs, heart, liver, or spleen. The abdomen was retracted; pulsation of the abdominal aorta was distinctly visible and palpable. Examination of the urine was negative.

The patient died two days after admission. The autopsy showed isolated primary tuberculosis of both adrenal glands, with incipient tuberculous meningitis.

The chief point of interest in this case was the fact that there was no tendency on the part of the discrete pigmented areas to run together and become diffuse. The patches of pigmentation remained isolated throughout up to the time of death. Although the onset of pigmentation in Addison's disease is occasionally in the form of discrete patches, yet in nearly all these cases the pigmentation becomes diffuse before the fatal termination of the case.

Trebitsch states that these cases of Addison's disease might be mistaken for various affections in which pigmentation of the skin occurs. Among these he mentions the idiopathic multiple sarcomata of Kaposi, xeroderma pigmentosum, pigmented lesions following syphilis, and lentiginos.

Changes in Metabolism and the White Blood-Corpuscles in Blood Dissolution.—KUHNAN (*Deutsch Archiv f. klin. Medicin*, 1897, Band lviii. 4 u. 5 Heft) studied the changes in metabolism and white corpuscles in diseases associated with dissolution of the red cells, and arrives at the following conclusions:

1 In blood dissolution there are marked leucocytosis and alterations in metabolism. The metabolic changes consist in:

- (a) An increase in the uric acid and xanthin bases elimination.
- (b) An increase in the excretion of phosphoric acid at first, followed by marked diminution later.
- (c) An increase in the elimination of the chlorides.
- (d) An establishment of a vicarious relationship between the chloride and phosphoric acid elimination, the retention of one being associated with an increased excretion of the other.

2. The increase in the alloxuric bodies (uric acid and xanthin bases) is dependent on an increased destruction of leucocytes.

3. The mother substance from which the alloxuric bodies are formed is contained chiefly in the plasma and serum of the blood, and to a much less extent in the red cells.

4. The amount of the uric acid forming substance is dependent on the richness of the blood in leucocytes.

5. The leucocytosis in blood dissolution is the result of the combined action of the following components:

- (a) The direct leucotactic action of the blood poison.
 - (b) The action of the chemical substances (particularly the nuclein substance) resulting from the destruction of the corpuscular elements of the blood.
6. The leucocytosis resulting from the injection of corpuscular elements into the blood stream is a pure phagocytosis, and does not lead to any marked destruction of the leucocytes.
7. The increased leucocyte destruction in infectious diseases is due to the presence in the blood of a substance which destroys the vitality of the leucocyte.

SURGERY.

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Hypertrophy of the Gums.—HEATH (*British Medical Journal*, May 1, 1897) reports a remarkable and somewhat uncommon case of hypertrophy of the gums in the person of a young man, aged twenty-six years. Hypertrophy of the upper lip and a fulness of the cheeks were the most prominent features when the mouth was closed, but when the mouth was opened it reminded one of the mouth of a hippopotamus or rhinoceros on a small scale.

The history shows that the hypertrophy was first noted about four years previously, when there was a comparatively slight hypertrophy of the gums and no displacement of the teeth. This hypertrophy was removed at that time by operation. Three months later the patient noticed the growth again, and it has steadily increased during the last three years.

The external deformity was well marked on admission, and the gums were seen to be enormously hypertrophied when the mouth was open, and most of the teeth were loosened and displaced. The palate looked at first like a cleft palate, but this was due to the hypertrophied gum on each side covering the palate nearly to the median line, where a small interval was left.

On account of the free bleeding experienced in a former case, the patient was placed on a table with the head falling off. The teeth were then rapidly extracted—all the teeth of the upper jaw except two canines, which were firm—and the hypertrophied gums cut away with scissors down to the alveolus, the edge of which was removed by the bone-forceps. The bleeding was checked by the Paquelin and by plugging.

A Case of Rupture of the Spleen; Splenectomy; Death.—STRANG and WARE (*British Medical Journal*, May 1, 1897) report the following interesting case of a man, aged fifty-one years, who was caught between the shaft of one cart and the wheel of another.

When admitted he complained of pain in the abdomen, especially on the left side, and looked extremely ill. His face was pale, his lips blue, respirations rapid, and pulse very collapsing. There were no evidences of fractured ribs. The abdomen was almost motionless, and the left side was exceedingly tender; there was distinct dullness in the flank, which did not alter with change of position. The right flank was resonant except toward the extreme back. He passed urine which did not contain blood, and the bowels acted twice naturally. He seemed to be in great pain, and to alleviate this tincture of opium m_x was given. A diagnosis of internal hemorrhage with probable rupture of the spleen was made.

The patient's condition became rapidly worse, and he consented to operation. Two and one half pints of normal salt solution were injected before the operation, and had a marked effect upon the pulse.

The opening of the abdomen was followed by a gush of blood; the liver was intact, but the spleen was found to be ruptured on its anterior border. There were large masses of clotted blood encountered, while the adhesions to the surrounding parietes were very dense, and it required considerable labor to free the spleen and remove it. The shock to the patient was very great, and he died before the wound was closed, in spite of strychnine and transfusions.

Wounds of the Air-passages.—Of twenty-five cases of suicidal wounds of the throat that came under the care of PLATT (*British Medical Journal*, May 8, 1897) ten involved injuries of the air-passages. The method of treatment to be employed he summarizes as follows:

1. Suicidal wounds of the throat should be treated by primary suture in all cases where the general condition of the patient permits.
2. Antiseptic precautions are most important.
3. If necessary, chloroform should be administered and is perfectly safe.
4. Divided muscles should be sutured, and in bringing together the edges of skin the inversion caused by the platysma muscle should be corrected.
5. The wound in the air-passage should be completely closed.
6. In many cases it is quite safe to dispense with the use of a tracheotomy tube. If a tube be deemed necessary, it should not be introduced through the suicidal wound in the air-passage, but through a fresh vertical cut at a lower level.
7. Silk is the best material for suturing the larynx or trachea.
8. During the after-treatment it is unnecessary, except in certain special cases, to feed by a tube or by the rectum.
9. If the above methods of treatment be adopted, not only will a very large proportion of even dangerous and extensive wounds of the air-passages recover, but the period of recovery will be greatly shortened. The patient will not be exposed to the same risks of secondary inflammatory complications, and he will be much less liable to the occurrence of permanent stenosis of the trachea or the formation of aërial fistulae.

Intestinal Anastomosis by Means of a New Pattern of Decalcified Bone-ring.—BALL (*British Medical Journal*, April 24, 1897) describes a new pattern of decalcified bone-ring, by means of which end-to-end anastomosis can be rapidly and simply performed and yet perfect security obtained from the dangers which not infrequently follow the use of mechanical metal devices.

The following are the prominent indications which the author believes all such devices should fulfil and he believes his model secures:

1. Sufficient surface of each end of divided intestine should be opposed in order to obtain a firm band of adhesion.

2. No leakage should be possible along the line of union.

3. No great pressure should be made by the appliance used on the gut outside the junction which might endanger the vitality of the intestinal wall.

4. No undue narrowing of the lumen of the bowel should result from the operation.

5. The method selected should be capable of rapid application; this obviously becomes a question of great importance in cases of multiple resection.

6. In cases where the intestine above the obstruction is much dilated, while that below is contracted, the procedure should allow of as even and uniform adjustment as is possible with tubes of unequal calibre.

The introduction of the Murphy button marked an epoch in intestinal surgery, and its use has in the author's hands been attended with most excellent results; but so many cases have occurred with retention of the button or of extravasation when it is separating, either from insufficient adhesion together of the ends, or from sloughing due to tension of the gut over the instrument, that he has given up its use.

The decalcified ivory or bone-ring which he has devised differs in some essential points from those already in use. They are made in three sizes, which are sufficient for ordinary cases. The centre of each is perforated to allow of the passage of intestinal contents; the upper and lower ends are smoothly rounded off, while around the circumference a deep groove is turned, wide enough to allow involution of the cut edges of the intestine while keeping the peritoneal surfaces in tolerably close contact. A considerable undercutting of this groove provides accommodation for any surplus of involuted intestine. The chief feature in the application of this ring, however, is the fact that a continuous lacing suture connecting both portions of the intestines is passed loosely through the entire circumference of the divided ends before the ring is placed in position. The suture is passed from the outer to the inner aspect on one end and from the inner to the outer on the other. When the circuit is complete the free ends should be opposite each other. The loops are now separated at one point and the button slipped in, and then by gently pulling the suture, loop by loop, as you would the lace of a boot, it is gradually tightened into the groove of the ring, at the same time drawing in and involuting the cut edges of the intestine and bringing their peritoneal surfaces into contact. The opposing serous surfaces are now united by a series of sutures passed parallel to the line of union on alternate sides. The author believes this method can be as rapidly applied as any, and is free from all danger of leakage. Some of the buttons are made with different cavities on either end for the anastomosis of a larger into a smaller portion of the bowel.

Bacteriological Investigation of 312 Cases of Surgical Infection.—CURRY (*Boston Medical and Surgical Journal*, April 22, 1897) reports the following as the results of his investigations:

In 115 cases of abscess the streptococcus was found much more frequently than is usual. Pure infection occurred in 39 per cent., the staphylococcus aureus in 41 per cent., and the albus in about 10 per cent. He accounts for the large percentage by the fact that the cases were severe enough to be taken into the hospital wards, a greater percentage being found in the ward cases than in the out-patient department, where the cases were not severe enough to require admission.

The number of cases examined were found to contain the following forms: streptococcus pyogenes, 56; staphylococcus pyogenes aureus, 52 times; staphylococcus albus, 29 times; bacillus pyocyaneus, 4 times; micrococcus lanceolatus, 2 times; bacillus diphtheriæ, 1 time; bacillus coli communis, 6 times; bacillus pyogenes fœtidus, 1 time; bacillus typhi abdominalis, 1 time; gonococcus, 1 time; amœba coli, 1 time; undetermined bacteria, 3 times.

Three cases of carbuncle had pure cultures, staphylococcus aureus.

Six cases of pustules, pure infections; four cases staphylococcus aureus; bacillus diphtheriæ, one; bacillus pyocyaneus, one case.

In six cases of furunculosis the aureus occurred in four; the streptococcus in one; the pyocyaneus in one.

In three cases of felons the aureus occurred pure.

In thirty-five cases of cellulitis the streptococcus was found in nineteen, the aureus in sixteen, the albus in seven, the pyocyaneus in three, the micrococcus lanceolatus in two, the megatherium bacillus in one, and undetermined bacilli in two. The streptococcus produced the severest cases.

In two cases of erysipelas the streptococcus was found pure.

One case of dermatitis had streptococcus and albus.

Of six cases of bubo five were pure and one mixed—one was streptococcus, one aureus, and the albus in three; the mixed infection was albus and streptococcus.

One case of acute vesiculitis contained gonococci.

Two cases of osteomyelitis of the tibia and one case of acute periostitis each had the staphylococcus aureus.

In six cases of pyosalpinx the streptococcus occurred in one, the aureus in one, the micrococcus lanceolatus in one, and the gonococcus in three.

The cases due to the gonococcus and micrococcus lanceolatus made good and more rapid recoveries than the others. The streptococcus died of septicæmia.

Three cases of endometritis showed pure cultures of streptococcus.

One case of peritonitis showed the micrococcus lanceolatus and the colon bacillus.

In one case of gumma, where the skin was unbroken, cultures made from an incision showed aureus and albus, due probably to infection from the skin.

Two cases of conjunctivitis—one due to the albus and streptococcus; the other, severer, to diphtheria bacillus.

Ulcers of the leg showed mixed infection. Those containing the bacillus pyogenes fœtidus were all extremely sluggish.

Fifty cases of appendicitis were examined. In most of these cases there was abscess-formation. The cultures were taken immediately from the abscess-cavity upon the opening of the abdomen. Where there was no abscess the culture was taken from the stump of the appendix. There were twenty-eight cases in which mixed cultures were obtained, twenty in which pure cultures were found, and two showed no growth. Of the entire number, twelve patients (24 per cent.) died.

The streptococcus occurred in fifteen, the aureus in one, and the colon bacillus in forty-six.

Of the twelve fatal cases, the cultures taken at the time of operation showed seven pure colons, in three streptococcus and colon, in one colon and undetermined bacteria, and in one no growth occurred.

The study of these cases brings out the fact that the absence of the streptococcus from cultures taken at the time of operation where there has been perforation is of negative result. That it may be an etiological factor is shown by three cases quoted, in which at the time of the primary operation no streptococci were found, but subsequently they were obtained, once at the autopsy and twice at secondary operations. It is probable that in the presence of the large number of colon and other bacteria usually present in such cases the streptococcus could not grow.

The results of bacteriological investigations of appendicitis are far from being satisfactory. The study of these cases simply emphasizes the fact that the presence of the streptococcus is usually attended with symptoms of the severest type. There is a great variability in the streptococci found here as well as in other inflammations. They may cause but slight disturbance, but are far more liable to result in general peritonitis or septicæmia. It must be borne in mind that in cases of perforation and abscess-formation the absence from cultures of pyogenic cocci is of negative value.

Thirty cases of otitis media showed twenty-four pure and six mixed infections. The conclusion to be drawn from the study of the cases is that the pyogenic cocci, especially the streptococcus, produce the severest forms of inflammation of the middle ear. While the pneumococcus may produce very severe inflammation and involve the brain or its coverings, still, in the absence of pneumonia or other complications, the case tends to recover readily.

In eighteen cases of empyema the streptococcus occurred eight times, the pneumococcus nine times, the staphylococcus aureus once.

Direct Intra-abdominal Finger-compression of the Common Iliac Artery during Amputation at the Hip-joint.—McBURNEX (*Annals of Surgery*, May, 1897) describes a new method of compression to be employed in amputations at the hip-joint, which he has employed with very gratifying results in three cases.

It consists in an incision through the abdominal wall, such as he recommends in operating for the removal of the appendix, at a point about one and a half inches internal to the anterior superior spine of the ilium. Through this incision the index-finger of an assistant is passed, and readily reaches and compresses the common iliac artery.

The advantages are entire absence of blood-current beyond the point of

compression; the absence of bandages or other appliances from the operative field, making asepsis more easy, and that it can be applied to all cases even where the deeper tissues have to be removed.

Osteotomy of the Femur as a Treatment for Tuberculous Disease of the Hip in Early Stages.—TOBIN (*British Medical Journal*, April 24, 1897) summarizes his views of this subject as follows:

1. That no treatment better than rest, combined with constitutional remedies, is known for tuberculous disease of the hip.

2. That a large proportion of cases of this disease, especially those in which flexion has occurred, go on to suppuration, and that one of the chief causes is the difficulty of giving the joint rest.

3. That much of this difficulty lies in the fact that the position of greatest ease for the tuberculous hip-joint is one in which it is very awkward for the patient to carry the limb, very difficult for the surgeon to fix it, and therefore one in which the joint is constantly exposed to disturbance.

4. That it is possible, and in many cases advisable, to remove this difficulty by such an osteotomy of the femur as will allow the limb to be put straight, while the upper of the fragments retains "the natural position of rest."

5. That the operation sometimes does good by relieving tension in the bone.

6. That an osteotomy of the femur when done in this respect is not as formidable an undertaking as it is under ordinary circumstances, for it is not the division of the bone that is formidable in this operation, but the constrained position in splints and the long period of rest required for union. Now, since these latter incidents are a great gain for the tuberculous joint, they must be put to the credit of the operation, thus leaving very little to be entered on the debit side.

In commenting upon this article and the conclusions arrived at by the author, MARSH (*British Medical Journal*, May 8, 1897) says: In the first place Mr. Tobin holds that in early hip-disease the limb is flexed, abducted, and everted—the position of greatest ease—because the joint is distended with fluid. But is this the case? Large effusion in early tuberculous disease of those joints which are superficial enough to allow an investigation of this point—the hip, the knee, and the elbow—is seldom present, and I am not aware of any evidence to prove that the hip differs from other joints in this respect. The probability seems to be that the hip-joint, like other joints, is placed in the position of the greatest ease, not because it is distended with fluid, but in order that the swollen and sensitive soft structure may be placed as far as possible in a state of relaxation—one of the principal elements in physiological rest.

The joint does not necessarily contain fluid because it assumes the position in which most fluid would be accommodated.

The fact stated by Tobin that weight extension "does not act in the way it is represented as doing in the plates in hand-books of surgery," this author believes is not true, and that Tobin has missed the application of the weight, which should at first be applied in the line of the deformity, holding the limb in "the natural position of rest," and then gradually lowered to full extension as soon as the spasm of the muscles has been sufficiently overcome and the angle of flexion has been reduced.

In order to produce this result when the hip is the affected joint the leg must be extended on the thigh, and the whole limb raised till the spine is free from lordosis, and then supported in this position, the weight being made to act in the long axis of the limb. Then, as the weight gradually reduces the angle of flexion at the joint, the apparatus must be rearranged by reducing the height to which the limb is raised and by changing the position of the pulley so that traction is still maintained in the long axis of the limb.

The manner in which the joint tolerates weight-extension—an agency which one would think would, if the capsule were distended, add still further to the tense condition of the parts, and so produce pain—seems to indicate that distention cannot, as a matter of fact, be present. Moreover, if distention is really present, how is it that in numerous cases, within two or three weeks, the position of greatest ease, flexion, abduction, and eversion, can be exchanged for a position of full extension, the patient in the mean time remaining completely free from pain, notwithstanding that before extension was begun pain was considerable?

It seems reasonable to ask, seeing how readily extension can be substituted for the awkward position, as Mr. Tobin justly calls it, of greatest ease, and how well the change is tolerated, whether it is necessary to resort to such a proceeding as osteotomy? And, further, if the position of greatest ease is assumed merely to accommodate the fluid by which the joint is filled, might not the difficulty be surmounted by aseptic aspiration?

Gangrene from Carbolic Acid.—CZERNY (*Munch. med. Woch.*, April 20, 1897) says that, in spite of the repeated warnings which have been given on this subject, there is not a year passes in which he is not able to show to his classes cases of gangrene brought about by the use of carbolic acid solutions as dressings.

They are generally produced by the continued use of moist dressings containing the officinal 3 per cent. solution of carbolic acid and applied as an anti-septic dressing for minor wounds of the extremities. The anæsthetic action of the carbolic acid makes the patient unmindful of the insidious action of the drug, and he is much surprised to see the fingers whiten and finally turn black; a line of demarcation shows itself sharply, and amputation finally becomes necessary.

The author illustrates his subject by the report of three cases which were sent in from the country to his clinic. The danger of the solution, even a 1 per cent., is very great if the use is prolonged, and he advises that carbolic acid should never be used as a moist dressing. Other antiseptics are fully as efficient without this danger.

Typhoid Perforation Treated by Surgical Operation.—FINNEY (*Johns Hopkins Hospital Bulletin*, 1897, No. 74) finds the following facts in the study of the literature on this subject: In fifty-two cases there were seventeen recoveries; but if doubtful cases are eliminated we have thirteen recoveries from forty-seven cases, making a percentage of 27.65. In nineteen of the fatal cases autopsies were obtained.

The author derives from his study the following points: The best time for operation is apparently as soon as possible after the patient has recovered from the shock attending perforation. This is usually in a few hours. There is a remarkable uniformity in the condition of the peritoneum and viscera; intense congestion, much feculent pus and exudate, with distention of the bowel. As the ileum is the usual place of perforation, it should be examined first; a suture should be taken over any suspicious-looking patches, and the appendix should be removed if it be at all abnormal. If the inflammation does not involve the whole peritoneal surface, irrigation with the necessarily mild fluids might tend to spread the infection. In dealing with the perforation, to excise the edges takes too long, and healing usually takes place without. Should the wall be in such a condition as to make suture impossible, it would be better to pull out the loop of intestine and leave it until the patient has recovered from his fever. The line of suture must be determined by circumstances; the mattress suture is to be preferred. Drainage should always be employed.

Little dependence can be placed on the so-called characteristic symptoms of perforation; the marked leucocytosis which follows it is the most certain diagnostic sign. The white corpuscles increased from 3000 to 16,400 in the case reported by the author.

As regards incision, the median has obvious advantages in general, but if the abdominal muscles are too rigid, it is better made over the part most often affected. Autopsies have shown that healing was always well under way. Death usually occurred from septic absorption, but the records show some other complications, obstruction of the intestines, a second perforation, defective drainage, or an abscess. General peritonitis makes a case very serious, but with operation the chances are about 1 to 4.

The author prefers an oblique incision of six inches in the right iliac fossa. The cæcum is found and the appendix examined, and then the ileum is drawn out and examined, an assistant wiping it with warm sponges out of normal salt solution. They are covered with warm gauze, and the peritoneal cavity is wiped out. The intestines are then replaced, with the sutured coil next the abdominal wound and drainage leading down to it and packed about it. The abdominal wound is closed except for drainage. In cases of distention the bowels should be moved easily and thoroughly by calomel in broken doses, followed by salts, and if necessary a high turpentine and soapsuds enema. If stimulation is necessary, use hypodermics of strychnia, enemata of hot, black coffee, or transfusions of a quart or more of normal salt solution into the cellular tissues under the breast.

The author reports three cases with one recovery, and concludes that:

1. Of all the so-called signs of perforating typhoid ulcer most reliance is to be placed upon the development during the third or fourth week of an attack of typhoid fever of severe, continued abdominal pain, coupled with nausea and vomiting, and at the same time a marked increase in the number of white blood-corpuscles.
2. The surgical is the only rational treatment of perforating typhoid ulcer.
3. There is no contraindication to the operation, surgically speaking, save a moribund condition of the patient.

The Technique of Arthrotomy, Arthrectomy, and Resection of the Knee-joint.—With the purpose of permitting a free examination and exploration of this joint, while preserving to the greatest extent its function, NIEHAUS (*Centralblatt für Chirurgie*, 1897, No. 16) has employed for the past nine years the following method of operation, which he now publishes, feeling that he has had sufficient experience with the method to say what it is capable of producing and what its final results are. All the results have been satisfactory, both in children and adults, and where arthrotomy, arthrectomy, and resection have been performed.

The incision begins about three or four inches above the patella on the inner border of the rectus femoris tendon, passing through the vastus internus and about three-quarters of an inch from the patella, in a slight curve, to the inner border of the patella tendon at its intersection into the tuberosity of the tibia; here it sinks down to the bone. At the lower end of this incision a second is made at right angles to it, cutting below the insertion of the patella tendon. The patella tendon and its insertion into the tuberosity of the tibia are now severed by a broad chisel, which cuts from the inner side and turns outward a flap composed of the superficial tissues, the patella tendon at its insertion, and a thin lamina of bone into which it is inserted and comprising the tuberosity of the tibia. The whole length of the incision is now carried layer by layer through the capsule of the joint, so that when the knee is flexed the entire extensor apparatus, including the patella, its tendon, and the bony insertion into the tibia, can be turned outward, exposing the entire joint-surface to view, and making all parts accessible. By a further division of the lateral ligaments and the crucial ligaments in the intra-condyloid fossa, either with or without resection of the bony insertion, the entire posterior portion of the joint can be examined and curetted. After the necessary operation has been performed in the joint-surfaces, the severed portions are reunited by catgut sutures. The osteoplastic flap is fixed in position by a nail, which is removed after from ten to fourteen days.

This method of incision is especially useful in cases where there has been a dislocation of the semilunar cartilages, allowing of their suturing in their proper position.

The facility with which arthrectomy can be performed after this method is very great, as the entire joint-surface is made very accessible, and especially is this true of the synovial pouch beneath the tendon of the quadriceps muscle. The early erosions of tubercular disease are also readily dealt with.

In resections this method permits of a shortening of the extensor apparatus by resecting a portion of the patella.

The Results of Radical Operations for Hernia.—In speaking of the results which he has obtained by his method of operation for the radical cure of hernia, KOCHER (*Centralblatt für Chirurgie*, May 15, 1897) says that no method is applicable to all cases, but he believes that his method, which is not altogether dependent upon the aseptic healing of the wound or the permanency of the stitches, has marked advantages over some of the other methods, especially in elderly people and those having very large herniæ.

As the results of his method he quotes the results of 197 hernial operations

performed between 1894 and the middle of 1896. Of these, 103 cases of external inguinal hernia were operated upon by his method of lateral displacement. Perfect primary union—that is, where the drainage is removed at the end of twenty-four to forty-eight hours and the wound is completely healed—occurred in 91.3 per cent. of the cases, so that the patients left the hospital on the average of 10.7 days after operation. In 8.7 per cent. the healing was delayed, averaging 326 days. The larger the hernia the slower was the healing. Age also had a marked effect upon the results, patients over thirty-five years of age requiring on the average four days more for complete healing.

The results of this operation, as performed by Beresowsky in twenty-three cases, are also recorded, and in combination with his own eighty-eight make 111 cases of which the actual condition at present is known.

In these cases there were four cases of return, or 3.6 per cent. Two of these cases occurred where double hernie had been operated upon and two others had already been unsuccessfully operated upon by another method.

Twenty-six of the cured cases were operated upon previous to the middle of 1896, thirty-five cases in 1895, twenty-four in 1894, and finally twenty-three cases by Beresowsky in 1893.

During the period of three and one-half years that this method has been employed there have been no deaths. This, however, is not alone due to the method, but to other factors which influence the mortality of all operations. The cases were not all operated upon by the author: some were done by the assistants in his clinic.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Discission, Primary and Secondary.—ELSCHNIG (Vienna), to obviate the dangers of discission, both in the primary operation upon the lens and also in secondary cataract upon the capsule (increased tension and insidious iridocyclitis in the former, purulent infection in the latter), which he attributes to faulty instruments and methods of operating, has devised a narrow knife, resembling that of Graefe, but only 8 mm. in length, and sharp on both edges.

This (or an ordinary small Graefe knife) is inserted into the sclera in the horizontal diameter, 1 mm. from the outer edge of the limbus, with its flat surface parallel to the iris. The point of the knife is carried to the lower margin of the pupil, where it is made to penetrate the lens. The capsule is divided

from below upward by depressing the handle, the fulcrum in all these lever movements being furnished by the point of entrance in the sclera. If the knife is withdrawn slowly, the anterior chamber is usually preserved.

For capsulotomy in secondary cataract, the knife is inserted in the cornea near the upper limbus with its blade at right angles to a tangent to the corneal margin. The point of the knife is carried to the lower edge of the pupil, where the capsule is penetrated and divided vertically from below upward.—*Wiener klin. Wochenschr.*, 1896, No. 33.

Test for Feigned Blindness of Both Eyes.—PRIESTLEY SMITH (Birmingham, England) describes the following application of a new test for malingering: "A prisoner, awaiting trial, awoke one morning blind in both eyes, so he said. The man declared himself to be quite dark in both eyes, and acted the part of a blind man fairly well, overdoing it a little. The pupils were already under atropine and could, therefore, give no evidence as to the light reflex. A lighted candle was placed before him in a dark room. He was not required to 'look' at the candle, being nominally blind, but the candle was placed about where he appeared to be looking. A prism was then placed before one eye, its base inward; instantly the eye moved outward. The prism was removed, and the eye moved inward. The man was told that his blindness would certainly disappear as quickly as it came, and he probably understood that the fraud would get him into more trouble if persevered in. His sight was soon restored." This test utilizes the involuntary tendency to avoid diplopia by "overcoming" the prism.—*British Medical Journal*, No. 1851.

Non-suppurative Inflammation of the Lachrymal Glands.—R. L. RANDOLPH (Baltimore) reports a case of this extremely rare affection, occurring in a negro, aged thirty-nine years, with a history of rheumatism; but no history of syphilis or other related disease. It began with pains down both sides of the face and over the eyebrows. In a month swelling appeared at the outer canthus of each eye, which continued to increase for another month, and had continued stationary for a month when the patient was seen. There was intense pain, never located in the glands, but down the sides of the face and across the forehead. A hard nodular immovable tumor, painful to pressure, extended from the nasal end to beyond the temporal end of the orbital rim, measuring about 15 mm. vertically at the widest part. The outer half of the upper lids nearly touched the lower. It was impossible to evert the lids. The patient was otherwise well. She was put upon mercuric chloride and potassium iodide, with applications of hot water to the tumors. In three weeks they had diminished one-half; and in six months from the beginning of their appearance only a slight enlargement of the left gland remained; and the patient had been for some weeks free from pain.

Hirschberg has called this affection mumps of the lachrymal gland; but it is not shown to be connected with specific parotitis, to which the term "mumps" is commonly applied.—*Archives of Ophthalmol.*, vol. xxvi., No 1.

Nitrite of Amyl for Atrophy of the Optic Nerve. C. W. KORTROCK (Charleston, S. C.) reports a case of optic atrophy, in which great improve-

ment of vision followed inhalation of amyl nitrite after other treatment had failed to produce any marked effect.

A man, aged sixty-three years, a user of tobacco constantly for many years, and a very moderate drinker of whiskey, otherwise in good health, came with vision reduced to 15/LXX in the right eye, and the field of vision concentrically contracted and the optic disk slightly hazy and swollen. He ceased the use of tobacco and whiskey; and was treated with potassium iodide to the limit of 60 grains a day, and strychnine to one-tenth of a grain three times a day. Vision continued slowly to diminish, and at the end of eleven weeks was barely 15/CC.

Nitrite of amyl was then tried. The inhalation of a few drops placed on absorbent cotton produced flushing of the face, enlargement of the vessels on the optic disk, and a marked improvement in vision, a little of which remained two days later, when the inhalation was repeated. The inhalations were continued daily until the heart-symptoms became so disagreeable that it was thought best to discontinue them. Vision then remained permanently at 15/XXX. The concentric narrowing of the field remained without material change. The involvement of one eye and the absence of central scotoma seemed to indicate that the trouble was not due to tobacco or alcohol.—*Ophthalmic Record*, May, 1897.

Removal of the Crystalline Lens in High Myopia.—VON HIPPEL (Halle) reports the removal of the lens for high myopia in 114 eyes during the past four years, a majority of the cases remaining under observation.

He recognizes two forms of myopia: The one, due to abnormal growth of the eyeball through muscular compression during the period of development, leads to but low or medium degrees of short sight, usually becomes stationary when bodily development is complete, and is rarely accompanied by pathological changes in the interior of the eye. The other is congenital, or begins early, progresses continuously, soon reaches a high degree, and leads to disease of the choroid, retina, vitreous, and to bulging of the globe as a whole. The former variety may be kept within bounds by hygienic measures, and the resulting impairment of vision can be corrected by lenses. In the latter we have to do with a serious disease of the eye; correcting lenses cannot be worn on account of their diminishing and distorting (prismatic) effects. Removal of the crystalline lens is the only resource for this class.

Discission, with subsequent evacuation of the lens masses, is the method best adapted for this purpose. Glaucomatous symptoms occurred in but four of Von Hippel's cases. The time required for the lens to become opaque after discission varied considerably in different persons, and even in the two eyes of the same individual, but was entirely independent of the age. Three days and twenty days were the limits between discission and extraction. The latter was usually practised from the fourth to the eighth day. Both eyes were operated upon, as a rule. Iridectomy was done several times. In most of the cases the degree of myopia lay between fourteen and twenty-five dioptries. Choroidal disease did not prove a counter-indication. Forty-six cases showed pronounced changes of this nature. Capsulotomy was done in almost every case as the final act.

Like other operators, Von Hippel also noted great improvement in the

visual acuity, generally after the lapse of many months. The reporter believes that the further progress of myopia is permanently arrested, but that the operation does not afford positive security against further involvement of the choroid, nor subsequent detachment of the retina, although the latter is not to be ascribed directly to the operation, but is dependent on the nature of the malady.

Of the 114 eyes, astigmatism is noted before the operation in but two (of the same individual). After operation its presence is recorded in thirty-five instances.—*Deutsche medicin. Wochenschr.*, No. 25, 1897.

Retinal Hemorrhage after Middle Age, and its Bearing on the Duration of Life.—HASKET DERBY (Boston) finds this symptom is one of great importance, and the prognosis serious. The detection of the disease is easy for one who has a moderate acquaintance with the examination of the interior of the eye. The cases themselves are far from infrequent; and the warning given by their occurrence may be practically utilized for the regulation of important business interests. Life itself may often be prolonged by abstinence from exhausting labor, by appropriate relaxation, and by following a suitable regimen.

Of about ninety cases of the kind he had seen, Derby succeeded in tracing the subsequent course of events in thirty-one persons between the ages of forty-three and eighty-three. Twenty-five of these died after brief illnesses, some, indeed, with the utmost suddenness. Eleven of this number died of heart disease, fourteen of apoplexy. Five were at last accounts living, their average age when first seen being fifty-four, and their cases followed up on an average of thirteen years. One patient, a man of eighty-three, died of an affection of the bladder six years after he came for retinal hemorrhage.—*Paper read before the Massachusetts Medical Society*, 1897.

Treatment of Sympathetic Ophthalmia by the Extract of the Ciliary Body of the Ox.—LOUIS DOR (Lyons) has been led by theoretic considerations, including the idea that sympathetic inflammation of the eye results from an altered composition of the intraocular fluids, to try the effect of the instillation into the conjunctival sac of an organic extract prepared by macerating the ciliary body of the eye of the ox. He reports the case of a man who was attacked with sympathetic ophthalmia one year before, and in whom removal of the exciting eye, and subsequent active treatment, including mercurial inunctions and injections, and iridectomy, had failed to prevent blindness, with pain and hyperæmia of the eyeball. The regular instillation of the extract of the ciliary body was followed by great improvement in all his symptoms, his improved vision allowing him once more to find his way alone.

In another case of less severe sympathetic disease the improvement under the same treatment was equally noticeable.—*Gaz. Hebdomad.*, Ann. 44, No. 50.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Operation for Stricture of the Larynx by Grafting.—At the session of the Imperial-Royal Society of Physicians of Vienna, held May 14th (*Medical News*, July 10, 1897) GERSUNY mentioned two instances in which he attempted to apply Thiersch grafts to the surface of a cavity. In the first case, diphtheria had produced an almost complete cicatricial stenosis of the larynx in a child one year and nine months of age, and breathing was only possible through a canula in the trachea. Gersuny divided the larynx, excised the cicatricial mass, and covered the circular denuded area which was left with a graft taken from the thigh, and in order to keep it in place the cavity was tamponed and the skin sewed together over it. In eight days the tampon was removed and the flap was nicely united. The canula was kept in position for some time, and the larynx was dilated with bougies and tubes, as there was some tendency toward contraction. The canula was at last dispensed with and the child breathed normally.

Hemiatrophy of the Tongue.—DR. HAROLD N. MOYER, of Chicago, describes and depicts (*New York Medical Journal*, 1897, No. 975) a case in a young man, twenty-five years of age, who on November 22, 1892, had received a wound of the left cheek from a 32-calibre revolver, the bullet from which was supposed to have been imbedded "in the bone."

Diphtheria.—JESSEN (*Centralbl. für innere Med.*, May 15, 1897; *Medical News*, 1897, No. 1282) reports a case of diphtheria in a girl, nineteen years of age, in whom clinical evidence of the disease persisted for more than four months, despite energetic treatment, comprising the injections of Behring's serum and the topical use of lactic acid.

The Cure of Singers' Nodules.—At the late meeting of the Laryngological, Rhinological, and Otological Society, DR. HOLBROOK CURTIS, of New York, read a paper on this subject (*Medical News*, 1897, No. 1281). He stated that he was able to cure these nodules by a series of respiratory and phona-tory exercises, which at the same time, increases the size of the chest at the apices of the lung, and improves the quality of the voice.

Surgical Treatment of Lupus of the Larynx.—DRS. A. GOUGUENHEIM and A. GUINARD (*Annales des Maladies de l'Oreille, du Larynx du Nez et du Pharynx*, August, 1897) report a case of secondary lupus of the larynx in a child ten years of age which they claim to have cured by laryngo-fissure, ablation of the epiglottis, curettage, and thermo-cauterization of the entire mucous membrane of the larynx.

[The cure, however, is but three months old. It is to be hoped that it will be permanent, but, as a matter of fact, it is well known that lupus is liable to reappear no matter what measures are taken for its destruction. The authors refer to a case of lupus of the larynx reported by Dr. Brondgeest in 1896 to the Congress of Internal Medicine at Munich, which he had similarly treated by subhyoid pharyngotomy, and subsequently, after a recurrence, by laryngo-fissure, since which it had remained cured for six years. This is the only operative case of the kind which the writers of the paper found on record.]

Sarcoma of the Larynx.—DR. T. H. HALSTEAD, of Syracuse, N. Y., reported (*Medical News*, 1897, No. 1281) a case of sarcoma in a man, fifty-seven years of age, from whose larynx he had with the snare removed a round-celled sarcoma on June 17, 1896. One month later the growth was even larger than at the first operation. On January 29, 1897, tracheotomy was performed to relieve severe dyspnea, and one week later the growth protruded at the opening of the trachea, and in another week had reached the base of the tongue. The patient died on April 26th. There had been occasional slight hemorrhage, and profuse hemorrhage on one or two occasions.

Sarcoma of the Naso-pharynx in an Infant.—DR. HALSTEAD likewise reported the unusual case of a sarcoma in a female infant two years of age. The right side of the nose was occluded by a yellowish-white growth, while the soft palate was pushed forward by another mass. Tracheotomy was performed for the child's immediate relief, but it died shortly afterward.

Three Cases of Laryngectomy.—At the last meeting of the Laryngological, Rhinological, and Otological Society (*Medical News*, 1897, No. 1281) DR. CHARLES W. RICHARDSON, of Washington, D. C., reported an unsuccessful case of laryngectomy in a male subject, for malignant disease of the larynx, acute edema of the lungs having occurred suddenly on the evening of the second day after the operation.

The growth was found to be far more extensive than had been supposed, as it filled the whole interior of the larynx and extended into the trachea.

DR. JAMES KERR, of Washington, also reported a case of laryngectomy for malignant disease, in a female subject. The patient succumbed at the end of the first week from gradual failure of strength. The growth was a medullary carcinoma originating in some of the glands of the mucous membrane of the larynx.

In both instances tracheotomy had been performed. In the first instance one week, and in the second instance one month before radical operation.

DR. M. R. WARD, of Pittsburg, reported a case of laryngectomy in a girl, seventeen years of age, in whom a papilloma of the larynx had recurred as an epithelioma, the specimen having been found to be a mixed epithelial growth—an adeno-epithelioma. The patient died of exhaustion, a little over seven months after the operation, and almost three years after the disease had been first recognized.

[The continuousness of neoplasia in this instance would lead to the inference that the diagnosis of papilloma in the first instance had been defective, even though based upon histologic examination of the excised growth.]

OBSTETRICS.

 UNDER THE CHARGE OF

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The Pathogenesis of Eclampsia.—In the *Monatschrift für Geburtshülfe und Gynäkologie*, 1897, Band v. Heft 5, VOLHARD, of Halle, reviews in a very complete way the recent experiments which have seemed to demonstrate that the blood-serum of eclamptics is more toxic than normal. He concludes that this cannot be proven; but that, on the contrary, the blood-serum of eclamptics produces, when injected into animals, the same symptoms caused by normal serum.

Both blood-serums produce dissolution of blood-corpuscles and hæmoglobinuria; both affect most powerfully when injected continuously.

VOLHARD considers the very conflicting results of investigation concerning the poison producing eclampsia at length. He describes experiments upon animals, which strengthen his belief that a ferment closely allied to fibrin ferment produces eclampsia and also thrombosis. He inclines to agree with those who find the source of this in disintegration of the white cells.

[This able paper illustrates well the complexity of the problem of eclampsia. The practical deduction, however, is clear and positive; the nutrition and excretion of the pregnant woman are processes dependent upon many factors not thoroughly known. The balance of health in pregnancy is readily and often disturbed. Pregnant patients demand close and thorough study, with especial attention to excretion. The nervous system gives clinical information of great value in these cases, and usually warns against approaching danger. No one excretion is a reliable index of a patient's condition, but all excretory processes demand attention.—Ed.]

The Maternal Risk in Twin Pregnancy.—STEPHENSON, of Aberdeen, in his "Studies in Practical Midwifery" (*Scottish Medical and Surgical Journal*, No. 7, 1897), discusses the subject of twin pregnancy, and especially the maternal risks.

In general, the maternal mortality is more than double that of single pregnancy. This arises with some patients from convulsions—one in 81 cases against one in 363 normal cases.

Hemorrhage is five times more frequent in twin than single births, especially in the third stage of labor. The placenta is adherent twice as often in twin as in single births. Retention of the placenta necessitating interference was six times more frequent in twin than single births. Adhesion of the placenta was present in more than half the cases. STEPHENSON urges very sensibly that twin labor is an incomplete labor after the first child is born; the womb

is exposed to incomplete retraction, and hence to hemorrhage; no time should be lost in completing the delivery, preferably by version, thus avoiding risks of hemorrhage.

Between 6 and 7 per cent, less cases of twin labor end in a given time than with single births. As a result, care must be taken to avoid the dangers which delayed labor occasion.

In general, twin labor demands careful external examination of the patient to determine the presence of the second child. Unless the second follows quickly after the first twin, version should be done and the second twin delivered. All possible precaution should be taken to avoid failure of uterine retraction and hemorrhage.

Cæsarean Section.—In the *Boston Medical and Surgical Journal*, July 8, 1897, REYNOLDS reports the case of a multipara, with justo-minor pelvis, who had lost one child from difficult forceps delivery and had been delivered at eight months of a living child by a difficult forceps extraction. The operation was elective before labor began. The womb was turned out of the abdomen during delivery and the uterine wall closed with ten silk sutures, with six sero-serous sutures of fine silk. Gauze was passed through the cervix into the vagina. Mother and child made a good recovery.

Culture-diagnosis and Serum-treatment in Puerperal Infection.—In the *Edinburgh Medical Journal*, August 1897, HAULTAIN reports three cases of puerperal infection in which diagnosis of the sort of infection was made by cultures, and serum chosen for treatment with reference to the variety of the infective germ.

Case I. was a primipara who was delivered with forceps. After tardy recovery she had fever, with pain and swelling in right thigh, on the twenty-sixth day. On the thirty-second day a culture was obtained from the cervical canal and typical diphtheritic bacilli obtained. Three injections of anti-toxin, 10 c.c. each, with cleansing the uterus with bichloride, were followed by recovery.

Case II. was a primipara confined in a room over a foul stable. Well-marked general sepsis developed. Cultures from the cervix gave streptococci and bacilli coli communes.

Before death the blood showed pure growth of bacillus coli communis. The abdomen was swollen, the legs and abdomen had erythematous patches, the patient was drowsy, and developed joint and parotid abscess. Injections of anti-streptococcus serum were without effect.

Case III. was a multipara who had a streptococcus infection, with abundant germs in the discharge. Antistreptococcus serum was used by injection, and the womb was douched and packed in gauze soaked in serum. Repeated intrauterine douches were given, streptococci continuing in the discharge. The patient made a gradual recovery.

HAULTAIN urges the further trial of serum-treatment based on culture-diagnosis. It must be used early and continued after grave symptoms have ceased. Its value is less in mixed than in pure infection. Local antiseptic treatment and the injection of nuclein should accompany it.

[The Editor adds his agreement to the views expressed above. We have

had occasion to diagnosticate, by cultures and clinical signs, bacillus coli communis with streptococcus infection in a case of symphysiotomy and one of cœlio-hysterectomy. Our experience with serum-treatment fully coincides with Haultain, that early and repeated use of antistreptococcus serum is needed to obtain benefit from it. The peculiar virulence of bacillus coli communis and mixed infection is one of the most important and interesting phenomena in obstetric pathology.]

The Treatment of Bleeding in Pregnancy and Labor.—In the *Scottish Medical and Surgical Journal*, No. 6, 1897, BARBOUR calls attention, in an interesting clinical lecture, to the sharp distinction to be drawn in practice between cases of bleeding requiring vaginal tamponing and those in which this treatment would be most harmful, or fatal, in result.

In the first class he describes cases of abortion without much dilatation, placenta prævia in the early stages of labor, and torn cervix without relaxed uterus. In the second division were incomplete abortion where dilatation and emptying of the uterus was necessary; accidental bleeding from a fall, and post-partum bleeding from uterine relaxation.

He calls attention to the fact that in early pregnancy bleeding takes place from the whole uterine cavity; in the later months from the placental site only, as a rule. Hence the womb must be entirely clean and empty in early pregnancy for bleeding to stop, and in later pregnancy pressure must in some manner be exercised on the placental site. This is secured by uterine retraction, by gauze pressure, and the astringent action of hot water (120° F.). Ergotin is useful for continued action upon the uterine muscle. The formation of thrombi is considered most valuable, and in placenta prævia plugging the cervix with the fetal breech and limbs. In concealed hemorrhage the membranes must be ruptured.

[In addition to the excellent treatment which Barbour advises, we value highly strychnine given by hypodermic injection, to secure uterine retraction. In torn cervix we suture the rent, when extensive, with chromicised catgut, with excellent results. We have abandoned the use of gauze packing in cervical tear and bleeding in all cases where the patient's condition justifies the manipulation required in suture.—ED.]

Enucleation, from the Pregnant Uterus, of Interstitial Myoma.—BIERMER (*Centralblatt für Gynäkologie*, No. 20, 1897) reports the case of a multipara who, in the fourth month of pregnancy, suffered so severely from pressure on the bladder that operation was required. On section a myoma was found in the anterior uterine wall. It was grasped by forceps and enucleated, care being taken not to enter the endometrium. The tumor was three and one-half inches by two and one-third inches, and its removal left a considerable area for suture. This was closed by five buried catgut stitches, and over this the uterine peritoneum carefully united.

The patient made a good recovery. Life was felt soon after operation. The pregnancy continued until the seventh month, when a macerated seven months' fœtus was expelled spontaneously.

No cause for foetal death could be found. Pregnancy was certainly not interrupted by the operation.

A New Incision in Cæsarean Section.—FRITSCH (*Centralblatt für Gynäkologie*, No. 20, 1897) calls attention to the advantages of a transverse cut across the uterus at the fundus, in *celio-hysterotomy*. In a recent operation he made the abdominal incision so that the navel was in the centre of the cut. Hernia is less common after a high incision. The placenta was quickly and easily extracted without bleeding; the child's legs were readily grasped; the womb quickly contracted, seven sutures closing it completely. The incision was about 8 cm. (3½ inches) long. No blood or fluid escaped into the abdomen. A rapid recovery followed.

Fritsch urges that in operating upon the uterus the anatomy of the vessels is such that bleeding is best controlled when the uterus is incised transversely to its long axis, at the fundus. At the level of the tubes and ovaries the incision should be longitudinal to secure the vessels most readily.

GYNECOLOGY.

UNDER THE CHARGE OF

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Administration of Ovarian Tissue.—BODEN (*Deutsche med. Wochenschrift*, No. 45, 1896) reports two cases of climacteric disturbances, one following castration, the other being physiological. Two, later four, tablets of Merck's ovarian tissue were administered daily, the result being entire relief from the unpleasant symptoms.

In a third case, one of epilepsy in a young girl, appearing only at the beginning of menstruation, the attacks were controlled by giving eight tablets daily, but recurred when the dose was diminished.

JACOBS (*Polyclinique*, No. 23, 1896) prefers a preparation in wine, the daily dosage being five drachms, containing three grains of ovarian extract. His results were as follows: 1. Climacteric disturbances (including vesical irritation) were either relieved or ceased entirely, whether physiological or following castration; 2. The results were most prompt in patients suffering from chlorosis and dysmenorrhœa; 3. The influence of the extract upon reflex psychical disturbances attending pelvic affections was marked; 4. In all cases a rapid and permanent improvement in the patient's general condition was noted, digestive troubles disappearing, and the appetite being improved; 5. Climacteric hemorrhages resulting from neoplasms quickly ceased; 6. The therapeutic action of the remedy upon the general nervous system was early observed.

Technique of Abdominal Hysterectomy.—LANDAU (*Centralblatt für Gynäkologie*, No. 23, 1897) has modified Doyen's method as follows: With the patient in Trendelenburg's posture, the tumor is delivered, drawn for-

cibly upward and forward, and the posterior vaginal fornix is opened. The posterior lip of the cervix is seized with a volsella, drawn upward through the incision, and the vaginal attachment is severed all the way around. It is then easy to separate the bladder from below. The uterus is now held by the broad ligaments alone. An assistant grasps one ligament between his thumb and fingers while the operator divides it. Pressure is relaxed sufficiently to allow the uterine artery to spurt, when it is isolated with forceps and ligated, the vein being also secured if necessary. The ovarian artery and distal end of the tube are then tied separately. The same procedure is adopted on the opposite side, and the uterus is removed, the peritoneal edges being united with a continuous catgut suture. The vaginal wound may be closed, if desired, with the same or with a separate suture. No drainage is employed.

The writer believes that it is better to leave the adnexa if normal, as the operation is thus simplified. When it is necessary to remove them on account of disease, the broad ligament is first incised below the tube, or the tube and ovary are excised and the ovarian artery is tied after the uterine has been secured.

The writer regards this as the ideal operation in cases in which Douglas's pouch and the broad ligaments are free and accessible. If the mass is retrocervical or intraligamentous, it is enucleated sufficiently to expose the posterior vaginal fornix, when the same technique is employed.

The advantage claimed is that no stumps are left and mass-ligatures are not used, so that subsequent adhesions are less likely to form, and the danger of secondary hemorrhage is diminished.

Destruction of the Endometrium by Hot Injections.—SCHICK (*Ibid.*) discusses the value of various methods of removing the diseased endometrium. The ideal method, he believes, should fulfil the following requirements: 1. Absolute asepsis; 2. Removal of the entire tissues down to the muscular layer; 3. Thorough removal, so that no portion of the mucosa may remain; 4. Limitation of the destructive action, so that extensive injury to the deeper parts may be avoided.

None of the procedures usually adopted satisfies these requirements. In curettement the diseased mucosa is rarely completely removed, and then only in puerperal cases. Chemical agents, especially chloride of zinc, may cause destruction of the subjacent muscular tissue in some spots, while in others islands of mucous membrane remain untouched. Electrolysis produces the same result as caustics, though less effectively.

The writer, after various experiments, came to the conclusion that the effect of hot water was most satisfactory. Before employing it in the living subject he studied its action upon the endometrium in freshly extirpated uteri. Water at a temperature of 80° to 85° C. was allowed to flow through an intrauterine catheter for periods ranging from thirty seconds to two minutes. After half a minute the entire mucosa was seen to be covered with a thin whitish layer, which penetrated more deeply according to the length of exposure to the action of the hot water. As practised on the living subject the writer's technique was as follows: The cervical canal is dilated with lamina tents until it admits the little finger. The patient is anæsthe-

tized, the genitals rendered thoroughly aseptic and the cervix is seized and drawn down with a volsella. To a kettle of water, heated by a Bunsen burner, is attached a rubber tube on which is fitted a Bozeman-Fritsch double-current catheter. A second tube communicates with a receptacle filled with ice-water, which is allowed to flow into the vagina before and during the operation. The hot water is now allowed to enter the uterus while the end of the catheter is constantly turned in different directions in order that the entire endometrium may be affected. As the hot water escapes from the os it mingles with the cold, and thus does not burn the vagina. Since the action of the heat is more intense upon living than upon dead tissues, the writer adds the caution that thirty seconds should be the limit of exposure. The degree of reaction is noted by the marked contraction of the uterus.

Several successful cases of menorrhagia are reported (including two cases of abortion and one of fibromyoma), in none of which were any unpleasant effects observed.

The writer calls attention to the different action of steam and hot water. The former has been introduced into the uterus for the purpose of controlling hemorrhage, while the effect of the latter is to destroy the entire lining membrane of the organ. While the writer has seen no failure of the mucosa to become regenerated when it is exposed to the action of the heat for half a minute, he thinks it wiser, until the subject has been more fully studied, to employ it only in the case of women with fibroids and those who are near the climacteric, in whom the preservation of the function of menstruation would be less important.

Anatomy of the Round Ligaments.—BEUTNER (*Monatschrift für Geb. und Gynäkologie*, Band v., Heft. 3) found from his studies in the cadaver that it was difficult to find the ligaments after they left the external ring. He advises that they be sought in the canal or at the internal ring. The average thickness of the ligament is 2.3 mm. There is considerable variation in the distance from Poupart's ligament at which they are found, as well as in the extent to which the cord can be drawn out (one and one-half to four inches).

In one case the ligament was split up into separate fibres in the broad ligament. It was found that by fixing the shortened cords near the symphysis the uterus was anteverted further, while by attaching them near the anterior spine more elevation of the organ was obtained, hence the latter method is preferable. On distending the bladder the uterus is seen to be in normal antelexion when thus suspended. If the ligaments are attached near the symphysis diverticula of the bladder are formed when the organ is distended, which might readily give rise to disturbances in the living subject.

Primary Sterility.—VEDELER (*Norsk. Mag. for Lægevid. Centralblatt für Gynækologie*, No. 26 1897) investigated the causes of sterility in 310 women who had been married for upward of a year without becoming pregnant, the average period being three years. Fifty husbands were examined, thirty-eight of whom had had gonorrhoea and thirty-four had certainly infected their wives. In 64 per cent. of the women evidences of pelvic inflammatory processes were discovered, which were doubtless of gonorrhoeal origin.

The Influence of Bicycling on the Kidneys.—MÜLLER (*Munchener med. Wochenschrift*, No. 48, 1896) mentions some interesting facts noted by him, which are apropos in connection with the general recommendation of bicycling by gynecologists. Analyses of the urine of twelve subjects were made. Albumin was found in 72 per cent., while 58 per cent. contained hyalin casts and renal epithelium. This supports the theory of Leube, that excessive muscular exertion may cause albuminuria ("functional") in healthy subjects, which is distinguished by its brief duration and the absence of any evidences of organic trouble. Since in Leube's experiments (with soldiers on the march) no casts were found with the albumin, the writer infers that their presence in the urine of bicyclists may be due to the fact that the exertion which the latter undergo is more severe. There seems to be no ground for apprehension, in his opinion, that chronic nephritis may develop in consequence of repeated and prolonged bicycling.

Histogenesis of Ovarian Dermoids.—PFANNENSTIEL (*Ibid.*) concludes a paper on this subject with an explanation of the mode of origin of mixed dermoids. He does not believe with Waldeyer that dermoids are really adenomata of the ovary, but affirms that these mixed tumors are due to simultaneous irritation of histologically different portions of the parenchyma, and that each portion "responds to this irritation in its peculiar way."

It is noteworthy that dermoids are usually found in combination with pseudo-mucin cysts, which, in all probability develop from the follicular epithelium, the combination with cysts lined with ciliated epithelium (which spring from the germ-epithelium, being exceedingly rare.

This mode of origin of dermoids may then be explained as due to the same impulse which incites the epithelium of the ovum to develop a dermoid, while at the same time from the follicular epithelium develops a pseudo-mucin or simple serous cyst.

Factors Influencing the Firmness of the Abdominal Cicatrix.—ABEL (*Ibid.*), after hearing from all but five out of 665 cases of abdominal section (a large proportion of whom he examined personally) operated upon between 1887 and 1897, with especial reference to the condition of the cicatrix, found that two factors were concerned in its permanent integrity, exactness of coaptation and suppuration of the wound. The average percentage of herniæ was about two and one-half. The best results were obtained when the fascia was united separately. Wound-suppuraton was the most obvious cause of hernia, especially when the fascial edges were not sutured separately.

The percentage of herniæ following suppuration varied from forty when suppuration lasted two weeks, to eighty when it continued for upward of four weeks. Other causes were active, such as excessive adipose, too early return to hard labor, abandoning the use of the bandage too soon, and pregnancy.

In tracing his cases the writer notes the interesting fact that among sixty-one patients who died since their return home, nine succumbed to intestinal obstruction.

Colloid Cystoma of the Abdominal Wall following Tapping.—SAENGER (*Centralblatt für Gynäkologie*, No. 25, 1897) reports a case of multilocular cys-

toma of the right ovary, which was tapped through the abdominal wall, a fistula remaining through which fluid continued to escape for several days. Three months later ovariectomy was performed, an adherent suppurating cyst being removed. At the time of the operation slight induration was noted at the site of the puncture. A year later the patient returned with a fistulous opening at this point, discharging offensive pus. The operation for its closure showed that a colloid growth had developed, which communicated with the interior of the gut, so that intestinal sutures were necessary. The patient made a good recovery. The writer calls attention to the fact that while implantation metastases are common in connection with malignant ovarian cysts, and cases have been reported following the removal of colloid growths, this is the only one to his knowledge in which all the layers of the abdominal wall have been involved and the disease has extended through the intestine. It possesses importance in its bearing upon the mode of implantation of such neoplasms.

Freund's Operation.—KÜSTNER (*Ibid*) reports sixteen cases with four deaths. The indications were: Unusual size of the uterus (especially complication with pregnancy or fibroids), narrowness of the vagina, marked friability of the cancerous cervix, and firm adhesions, which in one instance necessitated resection of the intestine, and in another of the bladder. This method can, of course, not be substituted for the vaginal, on account of the higher mortality, Freund's being being 31.6 per cent., while the best statistics (those of Zweifel and Redner), based on much larger series of cases, was 25 per cent. The dangers are due not to abdominal extirpation of the uterus *per se*, i. e., to shock, hemorrhage, or ligation of the ureter, as originally pointed out by Freund, nor to the greater technical difficulties of the method, but to the risk of sepsis, especially in cancer of the uterine body, where infection is often present before operation, as shown by the existing fever. The treatment of the wound is, therefore, of vital importance. The writer had two deaths out of five cases in which the peritoneal cavity was closed without drainage, and two out of four in which vaginal drainage was employed. In seven, in which the Mikulicz tampon was used, however, there were no deaths, hence the inference that the latter is more effectual in preventing the escape of pathogenic micro-organisms into the general cavity.

Extirpation of the Cancerous Uterus with the Cautery.—MACKENRODT (*Ibid*) emphasizes the difference in technique between vaginal extirpation of the cancerous and non-cancerous uterus. In the latter case the operation is simplified by the fact that the surgeon can keep close to the organ, thereby diminishing the amount of hemorrhage and running less risk of injuring the surrounding tissues. In operating for malignant disease, however, the incision through the vaginal fornx must be as remote as possible from the cancerous cervix, while the risk of secondary infection is great. During the past two years and a half the writer has used the cautery exclusively for separating the uterine attachments, with the result that during that period he has not observed a single case of recurrence in the cicatrix, and only one patient has died, from metastasis in the stomach. He at first used the Paquelin, but has abandoned it for the actual cautery, which he has employed in thirty cases.

In order to avoid delay he has three cautery irons, which can be raised to a glowing heat in a minute by means of a gas-burner fitted with a blow-pipe, so that as fast as one iron cools another is ready. There is some danger of injuring surrounding parts, but with practice this can be certainly avoided. While the immediate mortality is somewhat higher than by other methods—it is far less than that of abdominal extirpation—the results as regards freedom from recurrence are such that he confidently believes that “igni-extirpation” will be the operation of the future for the removal of cancerous growths in all localities, even in the rectum.

The Stump After Salpingectomy.—RIES (*Ibid.*), in three secondary operations upon patients whose tubes had been removed at previous operations, found the stump of the tube open in each instance at the distal end, and lined with the usual cylindrical epithelium. This would seem to explain cases of secondary infection through the uterus, either soon after operation, or later, as well as the few reported cases of pregnancy after double salpingectomy. This fact might also serve as an argument for removing the uterus with the tubes in infectious cases.

Intrauterine Injections.—DÖDERLEIN (*Ibid.*) reports the results of experimental injections of methyl-violet, iodine, and chloride of zinc solutions in six cases in which he was about to perform total extirpation of the uterus. The usual cautions were employed—thorough dilatation of the cervical canal, moderate force, and the maintenance of a return current, yet in all but one instance (a case of endometritis fungosa) the fluid entered the tubes and was forced into the peritoneal cavity. The writer infers that the result of these experiments throws considerable light upon the question of tubal menstruation and the extension of gonorrhœal infection. It is unnecessary, he says, to add that the fact of this perviousness of the tubes fluids should lead to the greatest care in regard to intrauterine therapeutics.

Elastic Tissue in the Fallopian Tubes.—BUCHSTAB (*Centralblatt für Gynäkologie*, No. 28, 1897), from a careful study of 102 specimens of normal and diseased tubes removed from children and women, arrives at the following conclusions: 1. Until the end of the first year elastic tissue is found only in the peritoneal and subserous coats of the tube around the vessels; 2. Between the ages of three and seven this tissue becomes thicker, especially in the neighborhood of the vessels, and fibres are seen in the muscular layers. A few delicate fibres appear in the submucosa; 3. In the tubes of girls between twelve and thirteen years of age, this tissue is well developed, the vessels being surrounded by a dense network. The muscularis mucosæ contains a small quantity, but it is absent from the mucosa; 4. Between fourteen and fifteen there is a great increase in the amount of elastic tissue throughout the different layers, and for the first time delicate fibres are observed in the mucosa; 5. In women between twenty-one and forty-five this tissue reaches its full development, while after the climacteric it begins to atrophy, reaching its minimum at the age of fifty-five years; 6. In the senile tube elastic tissue is found only in the serosa and superficial muscular layer; 7. There is a notable increase in hydro- and pyosalpinx, so that in some specimens it formed

actual layers, while in tubal gestation it is absent or slightly developed at the site of the sac, whether the latter has ruptured or not.

Acute Decubitus.—SECONO (*Revue de Gynécologie et de Chir. Abdom.*, 1897, No. 1,) reports six cases of decubitus in 542 cases of vaginal hysterectomy. In every instance the operation was performed for pelvic inflammatory conditions in young subjects. An extensive erythematous blush was first noted, on the fifth day in four cases, and on the third day in two. The temperature at the same time rose and the general condition of the patient was bad. Gangrene later developed, which exposed the bone, but no death occurred. The writer regards decubitus as a trophic disturbance due to reflex irritation and the inclusion of nerves in the clamps. It might also have been due to mechanical irritation of the pelvic nerves. The severity of the operation and prolonged pressure of the parts had nothing to do with the complication.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Bacterial Examinations of the Blood.—During life bacterial examinations of the blood are undertaken with a twofold purpose, either to assist the diagnosis by the detection of the specific germ of the disease, or to throw light upon the pathology of the disease in so far as the discovery of the specific germ in the blood may help our understanding of the general nature of the disease, and may elucidate the occurrence of complications at a distance from the site of the primary lesions.

As a diagnostic aid such examinations have proved to be very disappointing. The number of cases in which positive results have been obtained forms so small a proportion of the total number of examinations as to render them of but uncertain dependence in diagnosis. A negative result of such examination is to be accepted as in no way indicative of the non-existence of the suspected disease, and a positive result is rather to be regarded as a lucky chance occurrence than as something which might have been anticipated.

The matter is quite different, however, as regards the value of bacterial examinations of the blood as throwing light upon the general pathology of a disease. So long as it was supposed that the specific bacteria remained confined to the local or primary lesion of an infectious disease, their deleterious influence also was supposed to be similarly confined, and it was the hope of therapeutists that some means might be discovered of destroying the germs in the local lesion, and thus bringing the disease to a speedy termination.

It is clear that with the accumulation of evidence of a much wider distribution of the bacteria in the body the expectation of benefit from such local therapeutics becomes distinctly less.

But the discovery in the blood during life of the causative agent of an infectious disease goes far toward explaining the occurrence of distant and apparently spontaneous complications of that disease. As soon as it was made clear that the lesions of such complications in many instances contained the same germ as the primary lesion it was presumed that the transport of the infectious material must occur through either the blood or lymph channels, and in most cases of distant transport through the former. With the discovery of the encroachment of the primary lesion upon bloodvessels and the detection of the germs themselves in the blood during life, the proof of the correctness of this view became convincing.

The number of observations of the latter sort is now very considerable. The pyogenic germs have been detected in the blood during life by Rosenbach (1884), by von Eiselsberg (1886 and 1890), by Grawitz (1894), by Petruschky (1894), and others in cases of pyæmia; by Garré (1885), by Saenger (1889), and by von Eiselsberg (1890), in cases of osteomyelitis; by Czerniewsky (1888), by Stern and Hirschler (1888), by Grawitz (1894), and by Petruschky (1894), in cases of puerperal fever; in erysipelas by Grawitz (1894), and by Petruschky (1894); and in cases of malignant endocarditis by Saenger (1889), by Grawitz (1894), and by Petruschky (1894).

The pneumococcus has been found in the blood during life in cases of pneumonia by Belfanti (1890), by Bouley (1891), and by Sittmann (1894), and in a case of malignant endocarditis by Grawitz.

In 1894 Sittmann and Barlow detected the bacillus coli communis in the blood of a case of cystitis in which a general pyæmic condition had developed as a complication; and in 1895 the gonococcus was obtained by Thayer and Blumer by culture from the blood of a patient suffering from malignant endocarditis which occurred as a sequel to gonorrhœal infection.

The tubercle bacillus was detected morphologically in the blood during life in cases of tuberculosis as far back as 1884 by Weichselbaum, Meisels, Lustig, and others, but has not, I believe, been cultivated from the blood as yet. The differential method of staining the tubercle bacillus is, however, so characteristic as to make these observations reliable.

In 1893 the typhoid bacillus was obtained from the blood of a patient suffering from the typhoid fever by Thiemisch, and this observation has since that time been repeated by Ettlinger, by Stern (1896) and by Kühmann (1896).

Though from this enumeration it must be evident that already a very considerable number of observations of the presence of specific bacteria in the blood during life are at command, the recently reported observations of Kohn and Block are of much interest as throwing additional light upon this subject.

The investigation by KOHN was carried on in the Urban Hospital in Berlin (*Deutsche medicinische Wochenschrift*, 1897, No. 9).

In pronounced sepsis a positive result was obtained in every case in which the blood was examined, and in some cases the bacteria were obtained in large numbers. Thus in a case of acute ulcerative endocarditis the plated blood yielded 200 colonies of streptococci and several of staphylococci.

Of three cases of subacute and chronic endocarditis one only gave a posi-

tive result. This case was complicated by thrombo-phlebitis. Six colonies of staphylococcus developed on two plates made from the blood.

Negative results were obtained in cases of erysipelas, phlegmon, febrile jaundice, paroxysmal hæmoglobinuria, chronic leukaemia, pseudo-leukemia, and acute articular rheumatism.

Eight cases of typhoid fever were examined, with the result of detecting bacilli in two, but the positive identity of these germs with the typhoid bacillus was not convincingly determined.

In a case of pyæmia in which joint symptoms played a prominent part in the clinical picture, streptococci were found—six colonies on a plate which had been streaked with the blood.

But the most interesting and important part in the investigation had to do with examinations of the blood in cases of acute lobar pneumonia. Thirty-two such cases were examined, in nine of which a positive identification of the pneumococcus was possible. Seven of the positive cases terminated fatally, and the remaining two, in which recovery occurred, were complicated respectively by pneumococcus empyema and by pneumococcus abscesses.

Of the twenty-three negative cases, eighteen terminated in recovery. Of the five fatal cases of this group, the fatal determination was due in two apparently to secondary infection with the streptococcus (empyema), in one the patient was alcoholic, and in a fourth bacterial examination of the lung after death made it probable that the pneumonia had been due to the influenza bacillus, not to the pneumococcus.

In the fatal cases in which a positive result was obtained the pneumococcus was detected in some cases as long as forty-eight hours before death.

The results of these examinations are certainly very striking. With all due allowance for the fact that the mortality in Kohn's cases was somewhat high—37.5 per cent.—it is still very significant that in 28 per cent. of those cases the pneumococcus should have been detected in the blood during life. But, aside from this, the prognostic significance of the presence of the pneumococcus in the blood would appear to be very great, for of the nine fatal cases of pure pneumococcus infection in seven a positive result was obtained from the blood examination. For this reason Kohn concludes that the presence of the pneumococcus in the blood of a patient suffering from pneumonia is to be regarded as a bad prognostic indication, and that in such cases death would seem to occur as the result of pneumococcus sepsis if not as the outcome of more evident secondary lesions.

The other observation to which I would call attention was made at the Johns Hopkins Hospital by BLOCK, and is reported in the *Bulletin of the Johns Hopkins Hospital*, June, 1897. In this case the typhoid bacillus was obtained twice from the blood during life, its identity being in each instance carefully tested by cultures.

Owing to the inability of the patient, a Polish woman, to understand English, the history of the case is meagre, but it appears that she entered the hospital in a weak condition, with considerable dyspnoea, restlessness, apathy, and fever; that she soon became delirious and continued so until her death six days after her admission, and that during this time her temperature ranged irregularly between the normal point and 104.6°. Physical examination disclosed no lesion of the lung.

Two days after her admission $1\frac{1}{2}$ c.c. of blood was withdrawn from a vein of the forearm under aseptic conditions and was cultivated, resulting in the development of thirteen colonies of actively motile bacilli identical in every way with the typhoid bacillus, as was shown by numerous tests on various differential media. Three days later a second culture was taken by the same method, and when plated developed one colony of the same germ.

The autopsy disclosed the usual lesions of typhoid fever, in addition to which there was evidence of the invasion of the body by a gas-forming bacillus. Cultures upon agar plates yielded the typhoid bacillus in the spleen, liver, kidney, and in a portion of retained placenta; bacillus coli communis in the kidney and heart's blood; bacillus pyocyaneus in the heart's blood; and bacillus proteus in the bile. It is quite likely that the invasion of the bacillus coli and of the bacillus proteus occurred post mortem, the autopsy not having been undertaken until thirty-seven hours after death. The gas-forming bacillus failed to grow in both aerobic and anaerobic cultures.

This is, I believe, the only case on record in which the typhoid bacillus has been detected twice in the same patient and in such numbers as in the first test, both of which circumstances testify to the very large number of the germs which must have been present in the blood at different times in the course of the disease, and in the first instance as long as four days before the fatal termination of the case.

The Etiology of Serous Pleurisy—In an interesting article in the *Zeitschrift für klinische Medizin* (1896, xxix., 440), ASCHOFF brings together the results of his examinations of 200 cases of serous pleurisy, 41 of which are described as "idiopathic," clinically. The remaining 159 could be traced to other diseased conditions, in the course of which they occurred as complications. In 43 cases evident tuberculosis was present, and in 19 other cases it was suspected. Lobar pneumonia preceded the pleurisy in 26 cases, influenza in 11, and in 41 various other affections of the respiratory system or of the circulation. In 16 cases the pleurisy was antedated by articular rheumatism.

The exudate in all these cases was examined both microscopically and by plants on agar. In 193 cases the result of this examination was negative. Too much importance should not, however, be attached to these negative results for the reason that a very small part indeed of the exudate was examined in each case, and the implantations were upon agar alone. In similar examinations directed to the determination of the part played by the tubercle bacillus in the induction of serous pleurisy Eichhorst discovered that much depended upon the amount of exudate taken for the test. Thus in Eichhorst's investigation 65.2 per cent. of 23 cases were detected as tuberculous when 15 c.c. of the exudate were inoculated into test-animals, while less than 10 per cent. (1 of 11) of the cases showed tuberculosis when only 1 c.c. of the exudate was used.

Of the seven exudates in Aschoff's study which yielded positive results two accumulated in the course of cases of lobar pneumonia, one of them containing the pneumococcus, the other streptococcus. The same germs were also found in two cases of "idiopathic" pleurisy, and the streptococcus was cultivated from the exudate in a case of pleurisy consequent upon gangrene of the lung. One each of the positive cases occurred in connection with tuber-

culosis of the lung and as a part of a general sepsis. In these last cases the bacteria were detected only at the first examination, and the inference was that they died quickly in the exudate. In the five other cases the bacteria persisted and the exudate subsequently became purulent. From this Aschoff concludes that if the conditions are such as to permit the continued growth of the bacteria in cases of serous pleurisy the exudate in almost all cases sooner or later becomes purulent, the only exception to this being, perhaps, in cases due to the pneumococcus.

But the most valuable part of the investigation is that which relates to the part played by the tubercle bacillus in the induction of serous pleurisy. With a view to determining this, 3 c.c. of the exudate from 37 of the cases were injected into the peritoneal cavity of guinea-pigs. Twenty-five of these were cases of known or suspected tuberculous; 12 were "idiopathic." Sixty-eight per cent. of the guinea-pigs inoculated from the first set of cases became tuberculous, and 75 per cent. of those inoculated from the "idiopathic" cases. From this the inference is that a large proportion of the so-called "idiopathic" cases of serous pleurisy are in reality tuberculous. It will be noted that these results of Aschoff's investigation tally closely with those obtained by Eichhorst above referred to.

The Preservation of the Pneumococcus and of the Streptococcus in Cultures.—The difficulties attending the preservation of the vitality and virulence of the pneumococcus and streptococcus pyogenes are well known. It is rare for the pneumococcus to remain alive in cultures after the first few days, and the virulence of the streptococcus rapidly attenuates, though the germs themselves may remain alive for some time, and these peculiarities in the life-history of these germs have imposed formidable obstacles to their study. Much interest consequently attaches to a method of preserving these germs which has recently been proposed by BERNABEO (*La Riforma medica*, 1896, No. 21).

In the course of some experiments with the pneumococcus Bernabeo filled glass tubes, about 20 cm. long and 5 mm. in diameter, with blood directly from the heart of rabbits which had died of pneumococcus septicæmia. The tubes were then hermetically sealed over the lamp, all air being excluded, and were set away in a dark place at the room-temperature. Bernabeo was not a little surprised to find living and virulent pneumococci in blood thus preserved at the end of six months.

In the same manner streptococci were preserved for ten months, though at the end of that time they had lost some degree of their virulence.

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CONGENITAL DISLOCATION OF THE HIP.¹

BY E. H. BRADFORD, M.D.,
OF BOSTON.

It is the function of the specialists to examine and report on questions lying beyond the limit of accepted facts. In this way specialization is justified, furnishing outposts to the larger force marshalling the whole profession of medicine and surgery.

The subject of congenital dislocation of the hip has for the last decade been under careful consideration, and, as the brilliant successes that have been recently gained were largely won by two honored members of our Orthopedic Association, it may be fitting in a representative of that association to present the subject in a triennial address before the General Congress.

It is not within the province of this paper to relate the history of the various attempts in the past to cure congenital dislocation of the hip, though this is an interesting chapter in the history of surgical progress of this century. Briefly, it may be said that the world is especially indebted to the efforts of Hoffa and Lorenz. Previous investigators accumulated facts which have served as a preparation for later successes.

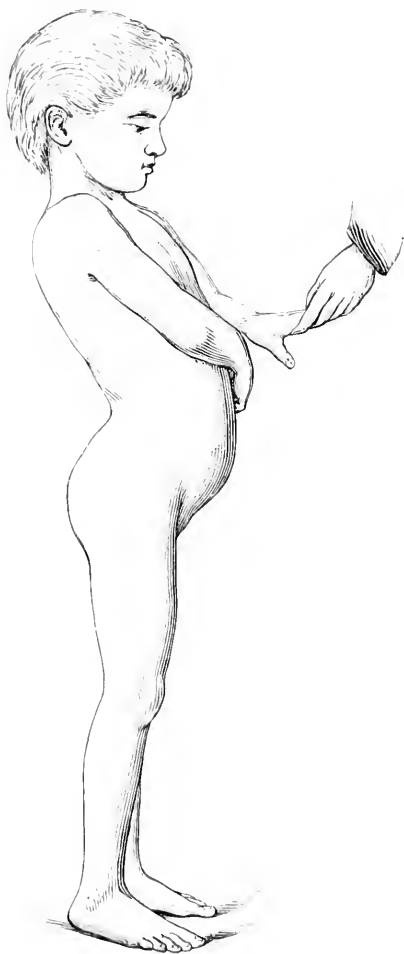
In considering the subject an accurate knowledge of the pathological anatomy, fortunately now well understood, is of importance. The etiology of the affection, however, is not known, though it is clear that true congenital dislocation is an affection of the uterine life. It would seem also that it is not a defect of development, like hare-lip, but like congenital club-foot, a malposition of bones with the resulting structural changes

¹ Read before the Congress of American Physicians and Surgeons, Washington, D. C.
VOL. 114, NO. 5.—NOVEMBER, 1897.

of the soft parts. It is a fact that the affection is much more common in girls than in boys, for some unknown reason.

The theory that the affection is due to intra-uterine pressure will appear to be substantiated by an infant specimen published by Mr.

FIG. 1.



Double congenital dislocation of the hip, showing lordosis.

Jackson Clark in the *Transactions of the British Orthopedic Society*, 1896, vol. i. page 36, where in uterine life the thighs were apparently flexed for so long a period without extension, as to cause the firm contraction of the anterior portion of the capsule. Later extension of the limb, possible from an increase of amniotic fluid or from any cause, would, in a shallow acetabulum, cause dislocation of the hip.

PATHOLOGICAL ANATOMY. *Changes in the Capsule.* The most important of the anatomical changes to be observed are the changes in the capsule. The capsule is not ruptured, as in a traumatic dislocation, but is gradually stretched. The upward ascent of the head is increased as the child's weight increases, and the capsule is dragged with it. It becomes even at an early age much thickened, especially in its anterior surface, and the shape of the capsular cavity is changed from that of an irregular globe passing from the rim of the acetabulum to the attachment around the neck of the femur. The capsule may be described as in shape like an empty purse-bag glued to the bone, the lower portion covering the acetabulum, the free portion enclosing the femoral head, and the purse-neck, the part where the head of the femur left the acetabulum stretching the adherent capsule with it.

FIG. 2.

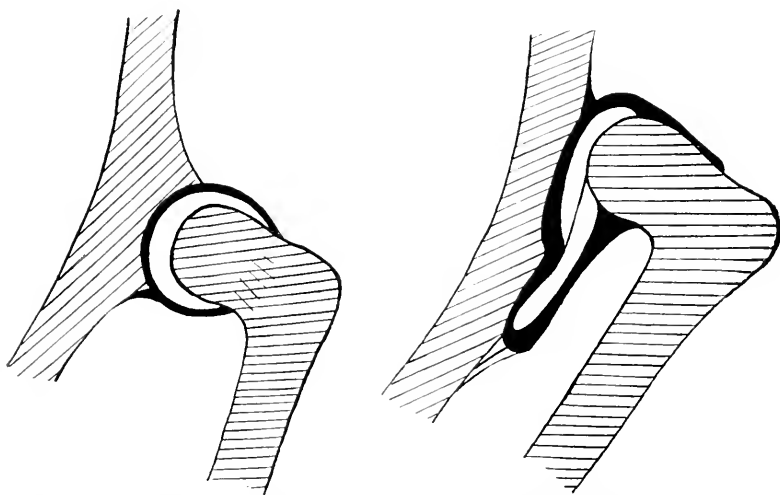


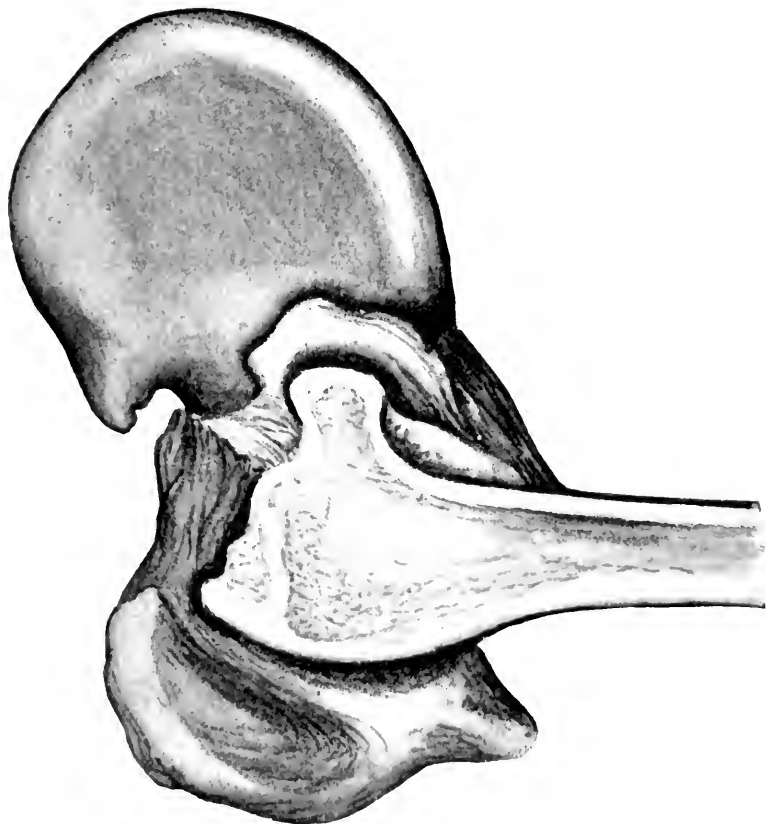
Diagram showing section of the capsule in a normal hip-joint and in congenital dislocation.

What may be termed the neck of the capsule is attached on its iliac surface to the ilium, and this attachment may be unusually firm, that covering the acetabulum becomes altered, and with the changes of the synovial membrane and stretched cotyloid ligament resembles firm fibrous tissue filling as well as covering the socket, so that the cavity may be obliterated.

Alterations in the Muscles. Much discussion has taken place in regard to this important matter. The arguments and observations of Lorenz, however, may be in the main accepted. It is not true, as has been previously claimed, that all the muscles that pass from the pelvis to the trochanter are shortened and constitute an obstacle to reduction. The

glutei are somewhat altered in their size and structure from alteration of their function owing to the difference in direction in which they move, but are not contracted, and the group of muscles which surround the acetabulum and pass around the neck of the femur to the great trochanter, *i. e.*, the pelvic trochanteric muscles, are lengthened. The pelvi-femoral muscles, *i. e.*, those inserted along the shaft of a femur, are, however, shortened, especially the adductors. This is also true of the pelvi-crural muscles.

FIG. 3.

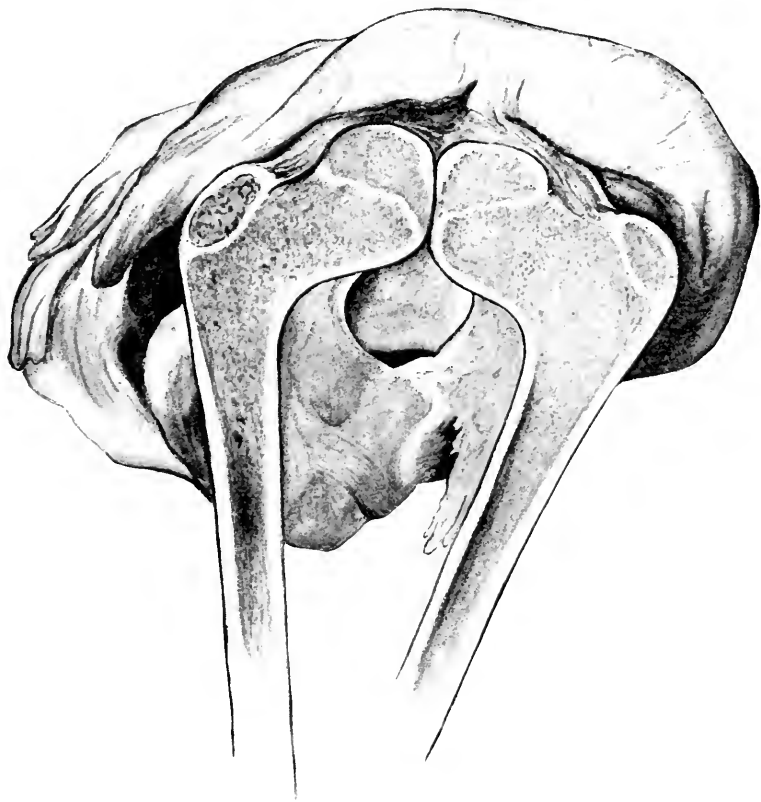


Congenital dislocation (Warren Museum). Femur sawn. The acetabulum not seen.
The thickened capsule shown.

Alterations in the Bones. It is due to Hoffa that it is now clear that the altered soft parts and not an absence of the acetabulum present the chief difficulty in reducing a congenital dislocation. The acetabulum, however, is altered in its shape, becoming triangular, instead of oval, and may be broadened and flattened. The cartilage which normally covers the socket disappears except at the rim, and is replaced by fibrous tissue.

The formation of a new false joint with osseous socket is not seen in congenital dislocation in children; it is extremely rare in adults, though a depression in the surface of the ilium at the point where the head of the femur rests is to be seen. The neck of the femur is frequently altered in two directions; the normal obliquity is lost, the neck being at right angles with the shaft. A twist in the neck is also seen. The shape of the head is frequently altered, the round shape is changed into a pointed one, and in some instances the head is much smaller than normal.

FIG. 4.



Specimen of congenital dislocation of the hip. Femur sawn through the head and shaft and turned back, showing the opened capsule. The dark space is the acetabulum nearly covered by the capsule.

There are three varieties of congenital dislocation, classified according to the position of the head. They may be classed as backward, upward, and forward. In the backward the head lies upon the dorsum of the ilium, resembling the position of the usual traumatic dislocation.

In the upward dislocation the head rests above the acetabulum, and in the forward the head lies nearly beneath the anterior spine. In the latter case the foot is drawn somewhat outward; in the former it is necessarily turned in, or this would be the position if it were not for alterations in the shape of the neck.

NOTE.—The anatomical changes in congenital dislocation are well illustrated by four specimens in the Warren Museum, carefully examined by Dr. E. H. Nichols, Instructor in Surgical Pathology in the Harvard Medical School.

The alterations in the capsule here mentioned are demonstrated in two of the specimens in alcohol, and the twist in the neck of the femora in the two dry specimens.

DIAGNOSIS. The diagnosis of this affection is not difficult in adult cases or in large children, as the characteristic peculiarities in gait and attitude are easily seen.

The following affections may be confounded with it in smaller children: coxa-vara, distortion following infantile paralysis, separation of the epiphysis, deformity following early arthritis of infancy, and traumatic dislocations, and the deformities of hip-disease.

In all of these affections, with the exception of the first, viz., coxa-vara, there should be a history of previous injury or illness; and in all, with the exception of coxa-vara and infantile paralysis, the freedom of motion of the femur seen in early congenital dislocation is not found.

Coxa-vara, or the rachitic distortion of the neck of the femur, which shortens the limb and raises the trochanter above the Nélaton line, may be confounded with congenital dislocation.

The mistake can be avoided if the fact is borne in mind that in coxa-vara the head is in its normal socket, while in congenital dislocation the head is to be felt outside of the acetabulum.

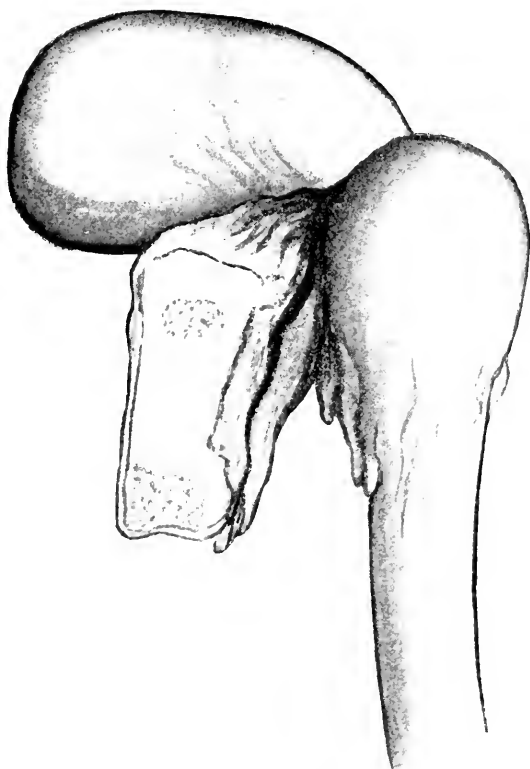
Coxa-vara is rarely seen before five years of age, and is only very exceptionally noticed as early as three.

In small children with fat buttocks it is sometimes difficult to find with certainty the dislocated head. As Delanglade has pointed out, the diagnosis is aided by remembering that where the head of the femur is in the acetabulum, rotation takes place with the acetabulum as the centre, and the neck as the radius of the arc of motion; where the head is out of the acetabulum, and the trochanter is the centre of motion, the looser head describes the arc.

The affection of congenital dislocation is occasionally regarded as a disease of the spine, as marked lordosis is always present, and in many instances spinal corsets have been applied with the idea that this is the chief source of the trouble. The affection, singularly enough, causes

but little anxiety in the minds of the parents, who either do not notice the difficulty or who look upon the peculiarity in gait as due to an infantile habit. The peculiar side-to-side gait of double congenital dislocation is pathognomonic. When the affection is unilateral the gait is also characteristic, and has been aptly compared by Saint-Germain to

FIG. 5.



Specimen of congenital dislocation of the hip (Warren Museum). Section through the acetabulum showing the covering of the acetabulum by the reflected capsule and the shallowness of the acetabulum.

the gait on the free side of an organ-grinder carrying a barrel-organ. The gait is due to the patient's attempt to diminish the strain upon the ligaments sustaining the weight and to supplement the *glutæi*, whose function is impaired.

Fluorescopic examination, when available, is of great value in diagnosis.

PROGNOSIS. The disability caused by this affection in childhood is slight. The limp is noticeable, and, in double congenital dislocation, may be distressing. As the patient becomes older and the weight

increases, some annoyance may be caused in adolescence; but the disability is ordinarily not great until middle life or old age. In single dislocation the disability in adults may be only an inability to engage in active occupation, accompanied by occasional attacks of severe muscular pain, with muscular cramps. These attacks subside under rest, but, if the patient becomes heavier or feeble, may necessitate the use of crutches and severe disability. Where the dislocation is on the dorsum the disability is greater than where it is anterior or above the acetabulum. Muscular patients suffer less than those with feeble muscles. In double dislocation the disability is increased.

FIG. 6.

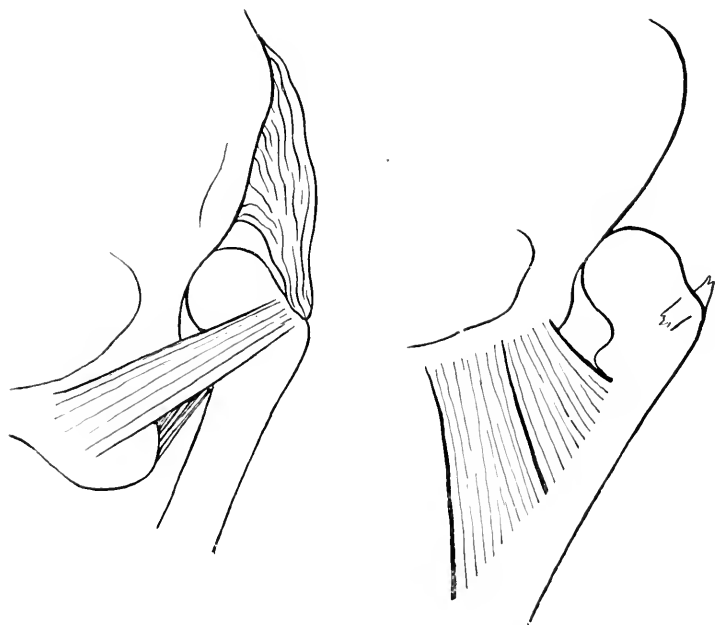


Diagram showing the position of the pelvi-trochanteric and pelvi-femoral muscles in congenital dislocation of the hip.

The pelvis, though altered in shape, does not appear to be changed in such a way as to interfere with childbirth.

TREATMENT. In congenital dislocation the weight of the trunk does not fall normally upon the lower extremities; the body may be regarded as slung to the femora by the capsule, aided by certain muscles, in the same way that the carriage of the last century was slung to the truck by straps. No cure of congenital dislocation is complete until the dislocation is reduced and it is certain that the weight of the trunk is supported on the head of the femur resting in the acetabulum.

As the tissues present obstacles in the shape of thickened capsule, shortened and misplaced muscles, an altered acetabulum and a misshapen femoral head, the procedure of reduction needs force or incision

FIG. 7.

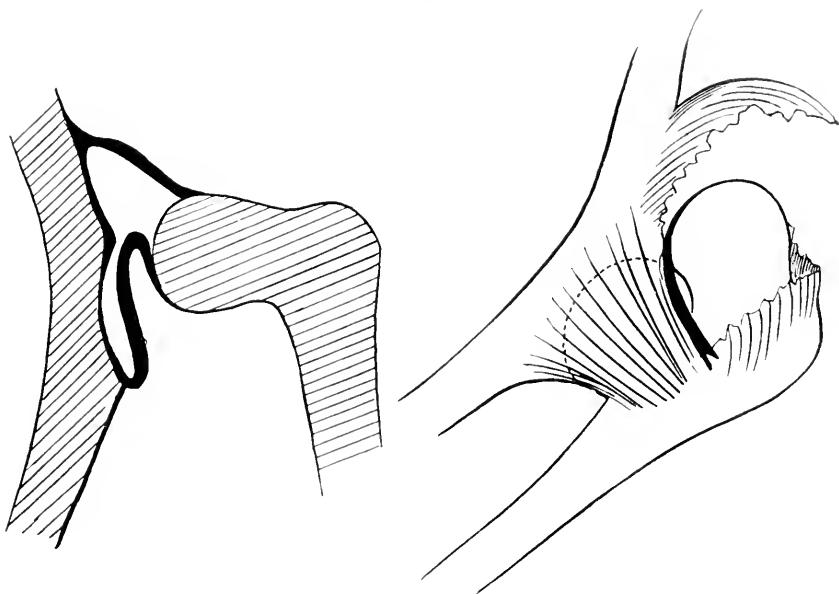


Diagram illustrating difficulties in reduction of congenital dislocation of the hip: first, in the capsule covering the acetabulum; second, in the shortened capsule between the acetabulum rim and lesser trochanter.

to stretch or divide contraction, means to deepen its socket, besides skill in manipulation for reduction. The methods can be grouped as

Reduction after incision.

Reduction by forceful manipulation.

Gradual reduction by mechanical appliances.

Operative measures apart from excision were first performed by Poggi and Margary; but it is to the credit of Hoffa that a successful method has been presented to the profession. Lorenz has improved the details both of reduction after incision and of forceful manipulation.

The patient is to be placed upon the back with the limb abducted and rotated outward. The incision is made in a line drawn from in front of the anterior superior spine, obliquely downward and forward, crossing the femur a short distance below the top of the trochanter. The incision should be along the outer edge of the tensor vaginae femoris, between this and the anterior border of the gluteus medius. The incision should pass well below the femur, and should cross it slightly above the level of the trochanter minor. The tensor vaginae

femoris is retracted, and the fascia lata divided by a straight incision, and, if necessary, by an additional cross incision. The gluteus is also retracted, and beneath the tensor muscle the rectus femoris will be found, with a reflected tendon passing outward, to be inserted upon the ilium above the acetabulum. If the muscular tissues are well retracted the capsular ligament will be uncovered and can be split. This should be done by an incision in the direction of the original skin incision, and should be free enough to expose the whole head and neck as far as the trochanteric line. An assistant should flex the thigh to a right angle to the trunk, and the attachments of the capsule to the neck and trochanteric line, including the lesser trochanter, should be freed both on the anterior and posterior surface of the neck to such an extent that the surgeon can pass his finger completely around the neck. The head can then be thrown out and the ligamentum teres divided, if present. The head of the femur can then be pulled aside and a clear view of the capsule covering the acetabulum, as well as the acetabulum, can be had. A curette can then be introduced to deepen the acetabulum, if necessary. It is important that the bony edge overhanging the acetabulum should project sufficiently to furnish a firm socket after the head is reduced. It is sometimes difficult, if the tissues are imperfectly divided, to find the socket, for the reason that a portion of the capsule lies flat across the socket, and is adherent to the edges, the surgeon feeling only the upper edge and a mass of connective tissue. This connective tissue must be divided in order to open the cavity.

It is sometimes necessary, if the head of the femur is conical in shape, to remove a portion, but if the cartilage on the acetabulum is removed and the head of the femur freed from its cartilage, ankylosis is liable to result. It is particularly necessary that the capsule should not be folded in attempted reduction in such a way as to prevent the free entrance of the head into the acetabulum, and it is especially important that the connection between the acetabulum and the femur at the trochanteric line and lesser trochanter should not be so firm as to prevent the reduction of the head into the socket. Where it is found that the head when reduced into the socket will not remain there if the leg is adducted or extended, some remaining fibres of the capsular attachments on the anterior surface, passing from the ilium to the lesser trochanter and its adjacent parts, will be found to exist. After the acetabulum has been deepened sufficiently, the reduction of dislocation should be performed.

Certain obstacles to reduction may be met, as follows: a thickened capsular fold above the apex of the acetabulum; narrowness of the constriction about the neck; undivided contraction of the capsule on the anterior and inner surface; contraction of the adductor muscles; a narrowness of the acetabulum. The manipulation necessary for the

reduction differs from that usual in reduction of dislocation of the hip in that if the tissues are sufficiently stretched or divided, the head will be placed readily into the newly formed acetabulum. Where the head can be placed into the acetabulum with the leg somewhat adducted, the femur can be used as a lever to stretch such portions of the capsule as have been undivided by the knife. After the reduction the redundant capsule can be stitched, with free drainage, or packed, according to the judgment of the surgeon as to need of complete drainage, or to trust to healing and absorption. Drainage is of especial importance, as the cavity is a deep one and may be shut off in the process of repair by muscular contraction. Furthermore, in this region the danger of infection from urine, in some small children, is great. The cases of death by sepsis are apparently due to omission of this precaution. The limb should be flexed by means of a plaster-of-Paris spica reaching from the thorax down to the foot, holding the limb in a flexed and strongly abducted position, and a window cut through the bandage to the covered wound. The amount of abduction is dependent upon the amount of difficulty in retaining the head of the femur in the new acetabulum. The position of the limb can be gradually brought to normal by later application of plaster-of-Paris bandages.

ULTIMATE RESULTS. Although the results of the earlier operations are not as favorable as those where added experience has taught the dangers and errors to be avoided, it is now thoroughly established that these cases can be cured by reposition through incision. This is not only shown by the cases of Hoffa and Lorenz, but by the specimen from the patient operated upon by Delanglade. A child of three years with double congenital dislocation, six months after a successful operation upon one hip, died from measles before the second hip was operated upon. A complete cure was found to have been gained, the hip being placed in a well-formed socket. Hoffa reports 82 cases of reduction by incision, 30 of these being double, 52 single; 7 deaths; one during operation (chloroform?), one from intestinal catarrh, one from pneumonia, one from diphtheria, and the others from narcosis or shock. Of those who lived there was a useful joint, with from one to three centimetres shortening in most cases, with good motion, though not full motion in all instances. There were 9 ankylosed cases, and 8 cases in which there was sepsis. Lorenz divides his cases into three series, the first, 12 cases in which there was suppuration and pus in five; and a series of 100 later cases where there were excellent results, with pus, followed by ankylosis in only one instance. In 2 there was a slight fibrous adhesion. Delanglade reports 40 cases of reduction by incision, and 5 deaths from sepsis, with excellent results as far as could be determined in all, with the exception of two relapses. The mortality from sepsis would appear to be higher than thorough surgery would justify. It should be

borne in mind that considerable difficulties are met in operating in this region, especially in children, where the danger of soiling the dressings with urine is great. It is for this reason that Hoffa advises that the wound should never be sewn, but should be packed, and antiseptic rather than aseptic precautions be used. Where the wound was not sewn he had no trouble from sepsis. It is to be remembered that the wound is a deep one, and thorough drainage is not furnished by all incisions. It can, however, be expected that where drainage and antiseptic precautions are used the danger from sepsis will disappear.

Schanz (*Zeitschrift f. orthopädische Chirurgie*, Bd. iv. Heft 2, p. 207) has collected 135 cases operated upon by twenty-one different operators. Death occurred in 7 cases. In 4 death followed from complication. In 8 the result was unsatisfactory. In 6 the result was but partially satisfactory. In 109 the result was excellent.

FORCIBLE REPOSITION. The first case I have been able to find of an attempt at forcible reposition under an anæsthetic in congenital dislocation of the hip is that performed by Dr. Post in 1884, and published in the report of the Boston City Hospital,¹ where the manipulations recommended by Bigelow for traumatic dislocation were done forcibly, and the dislocation was apparently reduced. A relapse, however, subsequently occurred. In 1888 the forcible reposition was recommended by Paci, and the method has been extensively discussed by Continental surgeons. The method, however, lacked precision until Lorenz, whose experience in reduction by the aid of incision had given him a thorough knowledge of the pathology of the congenitally dislocated joint, suggested the so-called bloodless method. The method has now been employed by Lorenz, Hoffa, and others with undoubted and permanent success, and with much less risk than that following reduction by incision. The operation has proved successful in children younger than five, and in some cases in children as old as seven. The method recommended by Lorenz may be described as follows:

Before the operation, traction to stretch the muscles should be employed, combined with gradually increasing abduction. After a short time of this preliminary treatment the patient should be anæsthetized and extreme force applied to the limb, with the thigh abducted. The child is placed upon its back and traction is exerted by means of a loop of yarn placed around the ankle and attached to a screw-force fastened to the end of the table. Counter-traction is exerted by means of a long sheet of folded cloth placed beneath the perineum on the unaffected side. Force is slowly applied. The pelvis is tilted, and abduction is thus developed. This stretches not only the adductor muscles and the flexors, but also the hamstring and rectus femoris muscles, and the

¹ Report of the Boston City Hospital, 4th series.

capsule which is firmly attached to the ilium, the shortened condition of which holds the femur in place. The ankle can be protected by saddlers' felt. If sufficient force is gradually applied, not only the capsular attachments stretch, but, the head of the femur being pulled upon, the capsular neck is stretched. This can be still further enlarged if the stretched leg is forcibly moved from side to side in such a way that the head and neck may force their way through the acetabular pocket. After this procedure has been carried on for several minutes, accompanied by forcible manual stretching in the shape of massage of the adductor group, and aided possibly by a tenotomy of the adductors, forced circumduction of the thigh should be carried out. The different manœuvres for reduction of the hip should then be executed, flexion, abduction, and in-and-out rotation, varied in different cases according to the obliquity or twist of the neck and situation of the head. The exact manœuvre which may be necessary can be determined if the hand of the operator is placed upon the head and its approach to the acetabulum determined. The reduction takes place with a noticeable jerk, as the head of the femur passes into the acetabulum, similar to what is seen in ordinary dislocation, but less marked. It will frequently be found that, after the reduction has taken place, dislocation will recur if the limb (previously strongly abducted and slightly flexed) is extended and adducted. This indicates that the anterior and inner attachments of the muscles and capsule are not sufficiently stretched, and would justify further attempts at stretching. As Lorenz has suggested, if the head is placed under the upper acetabular lip, the femur can be used as a lever to stretch the contracted tissues. After the reduction is thoroughly assured, the limb should be placed in a plaster-of-Paris spica, in a strongly flexed and abducted position, or, in other words, in such a position that the glutei muscles and the pelvi-trochanteric muscles can have a mechanical advantage over the flexor and adductor group. The amount of time the patient shall remain in this position will depend upon the amount of difficulty encountered in the reduction. Lorenz is undoubtedly correct, that if the patient is secured in such a way that flexion and adduction are not possible, the sooner locomotion is attempted, the better. In unilateral dislocation the patient should be allowed to walk, fixed by a plaster spica with the limb in an abducted position, within a few days, or as soon as the patient can stand. Where great resistance is encountered in the reduction, this may require a series of plaster bandages, some applied under an anæsthetic. After a while the fixed appliances may be removed and a split spica can be employed, allowing massage of the muscle. If the unaffected limb is raised the patient is obliged to walk with the affected limb abducted, which serves as a protection against recurrence. This also gives increased pressure inward and upward on the acetabulum. Treatment by manipulation

and massage should be continued for several months, and the protective appliances gradually removed.

NOTE.—I am greatly indebted to my colleague, Dr. Dane, for directions in regard to the method of bloodless reduction.

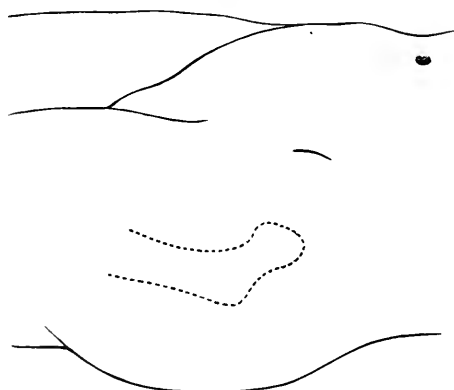
He employed this method successfully in a case, a girl of seven, in my service, after having visited Professor Hoffa and having witnessed several of his operations courteously shown him.

Minor modifications in the method may be found of use. As the important structure to over-resistance to complete reduction is the anterior and inner portion of the capsule, or, in other words, that portion of the tissues which prevents forcible abduction, it is manifest that the direction in which the limb should be stretched is in the direction of abduction. If a child is placed upon its back on a frame, and by means of weight and pulley a slight traction is exerted with the legs abducted, it will be found that the amount of abduction can be gradually increased. A counter-pull can be made by means of cross-straps pressing down upon the top of the trochanter, as is indicated in the accompanying illustration. This can be done without causing the patient great discomfort, and a position of forced abduction nearly at right angles with the trunk of the limb can be gained in young children after a short time. Later, under an anæsthetic, a stretching appliance should be applied in such a manner as to stretch in an abducted position. A most efficient apparatus for this purpose is furnished by adding a windlass-traction attachment to the well-known Thomas knee-splint. At the upper end the attached ring presses upon the tuberosity of the ischium and the ramus of the pubes; at the lower portion a windlass with a long-handled crank is attached. This is connected with straps fastened to adhesive plaster applied along and across the leg and thigh, and firmly bandaged to the limb. All desired power can be exerted and the limb can be moved forcibly in the direction of adduction. The patient should be placed on the back and the buttocks raised slightly by a pad. The traction appliance should be applied and traction slowly used, with the limb in as abducted a position as is possible. Under the traction, and with the help of the apparatus, abductions should be forcibly employed. This should be done until the axis of the limb is at a right angle with that of the trunk. After this the limb should be stretched in the direction of hyperextension under strong traction.

Greater precision is furnished by the mechanical arrangement for stretching here mentioned, but it is not always obtainable, and in its place manual force can be efficiently used in young children, aided by a strap or the hand applied so as to pull the greater trochanter downward and inward, while the thigh is forcibly abducted. It should

be remembered, however, that the manipulations needed in traumatic dislocation are not effective in congenital dislocation, the anatomical condition being different.

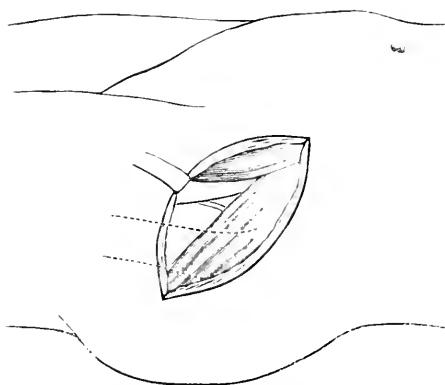
FIG. 8.



Line of skin incision for operative reduction.

In reducing congenital dislocation the limb should first be hyperabducted and hyperextended, as well as forcibly rotated, making room for the descent of the head by stretching the contracted capsule. If the stretching of the capsule can be thoroughly performed, a reduction can be effected; if not, an incision is necessary. The procedure varies

FIG. 9.

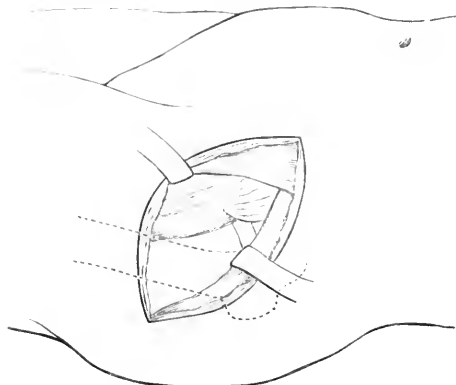


Operative reduction. Second step.

according to the amount of twist in the neck of the femur, as well as according to other anatomical conditions, but it may be described as forced hyperabduction, forced hyperextension, forced circumduction, followed by twisting the head into the acetabulum, the limb being somewhat flexed, abducted, and rotated outward.

NEOARTHROSIS OPERATION. Where it is impossible to reduce the dislocation, and in the older cases the alteration in the capsule and the adhesions are so great that this is found practically out of the question, an operation has been proposed by Hoffa for the establishment of a new

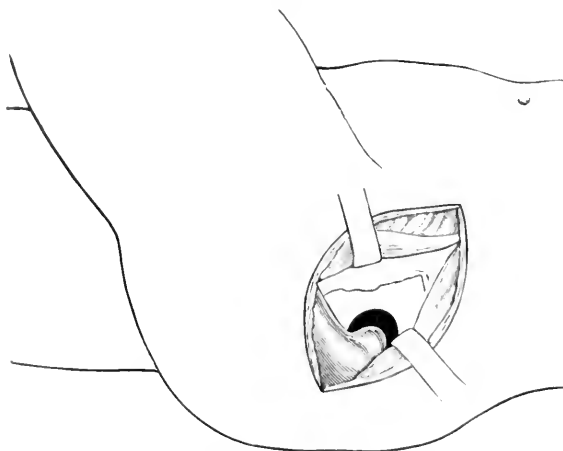
FIG. 10.



Operative reduction. Third step.

joint, based on the fact that in congenital dislocation there is no new formation of bone around the capsule, and that no true new joint is established. Hoffa claims that it is impossible that the pressure of the

FIG. 11.



Operative reduction. Fourth step.

head should furnish sufficient irritation on the ilium for the establishment of a new and firm bony socket, as it is separated from the bone by a thick capsule. He therefore recommends in these

cases the opening of the capsule, and by means of the curette irritating the bone, after reducing the deformity as far as possible by

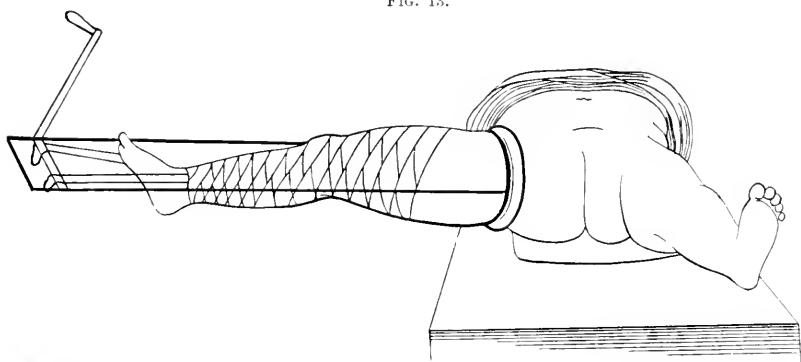
FIG. 12.



Method of traction preliminary to operation in double congenital dislocation.

means of traction, and using the contracted and shortened capsule in such a way as to prevent a free excursion of the bone upward when weight is thrown upon the limb. Although a few cases have been

FIG. 13.



Method of forcible stretching under anæsthesia with forcible abduction and hyperextension.

reported, the value of this method has not yet been thoroughly demonstrated. The unsuccessful cases of so-called Hoffa operation, where reduction after incision has not been effected, have been practically

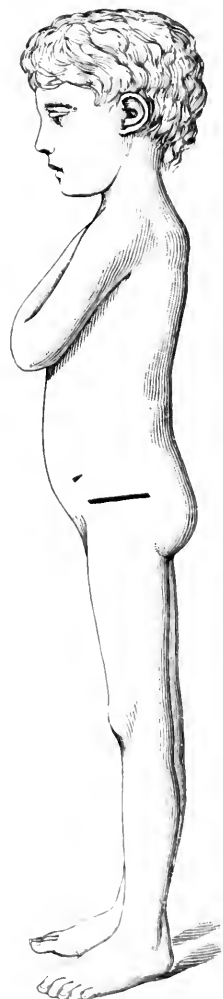
cases of neoarthrosis, and it can be said that anything which will thicken and strengthen the capsule will be an advantage. It is also an advantage

FIG. 14.



Child, four years old, showing profile of back after operative reposition (anterior incision) in single congenital dislocation of the hip.

FIG. 15.



Child, seven years old, after forcible reposition in single congenital dislocation of the hip, showing absence of lordosis.

tage to change the dislocation from a posterior to an upward dislocation, but the procedure must stand the test of time before adoption. It can, however, be hoped that with the perfection of detail in surgical technique, older cases may be more successfully operated upon than is at present true.

Excision of the head does not seem a proper procedure in congenital dislocation.

Generalizations as to the permanent value and limits of usefulness in operative reduction can, perhaps, not be made definitely before the next decade. It is certain, however, that in young subjects a reduction can be made, and, although the immediate improvement in gait is not always at first as great as could be desired, the amount of improvement gained, as well as the certainty that a femur acting in its normal posi-

tion will develop more normally than if dislocated, justifies the belief that the improvement in gait will be much greater in adult life than immediately after reduction. The gait of middle-aged or even adult patients operated upon when young has yet to be determined, but it is probable that it will be normal. Reduction by means of incision is at present an operation to be performed in all cases between seven and fifteen. The shock and mortality, as well as the relapses and stiffness observed in some cases, are due largely to imperfections in details always incident to the introduction of a new method. They are, however, remediable, and will disappear as the operation is done more rapidly and antiseptic details are more thoroughly carried out. Excellence in the result will depend upon the amount of deformity remaining in the neck of the femur. This in younger cases will be less than in older, but even in older cases a subsequent osteotomy of the neck of the femur, such as is used in coxa-vara, may be expected to give an increased improvement in gait.

MECHANICAL TREATMENT. It would seem as if the gradual reduction of a congenital dislocation of the hip into a loosely formed socket should be an easy one. Experience, however, belies such an opinion. One difficulty, apart from overcoming the muscular contraction, lies in the fact that a traction force which is exerted without an anæsthetic pulls the head past the opening into the acetabular pocket without sufficiently stretching the capsular attachment to the ileum, and leaves an interposing thick capsular covering which prevents the entrance of the head into the socket. It has been supposed that manipulation would force the head of the femur into the forming of a new acetabulum, but that opinion is based upon a false supposition of the pathological conditions. It is irrational to suppose that the head of the femur would force its way through a structure almost as firm as the tendo Achillis. There may be instances where the capsular neck is wide, and the head would easily drop into the proper position, but clinical experience does not support such a belief. Positive and enduring success under mechanical treatment has yet to be demonstrated by clinical evidence.

But even if it is doubtful if any case has been completely reduced under gradual stretching, it is possible that in the future this may be done by means of a traction force in the position of forced abduction which will thoroughly stretch the flexor and adductor muscles and the capsule, and later twisting the head through a widened capsular neck into the acetabulum. Any weakening of the joint could be overcome in time under graded and protected use of the limb. An attempt of the sort would be justifiable only in very young children, but at present no surgeon would be warranted in attempting it for a period longer than a few weeks.

PALLIATIVE MEASURES. As palliative measures are recommended in the shape of traction appliances and corsets, where for any reason

operative treatment is impossible and improvement all that can be aimed at, the question of the most rational means of improvement is the proper one, with the value of which a surgeon should be familiar. It is clear that any method which will shorten the lengthened capsule and lengthen the shortened muscles will be of advantage, but it is also clear that this will not be sufficient and effect a cure. The amount of benefit which can be expected is not great, but in the patients who have worn apparatus of this sort noticeable improvement in gait can be observed.

To express it figuratively, the body of the carriage slung on a truck would be hung higher if the straps which sustain the weight were shortened. A Thomas knee-splint furnished with traction meets the indications of a downward pull, and its use in young children will be found to lengthen the limb and interfere with the child's freedom in play and locomotion but slightly; lengthening of the limb can be obtained and maintained, and it is probable that in time the soft tissues will be altered. Corsets improve the patient's carriage and check the tendency to lordosis while they are worn; if accompanied by proper gymnastic exercises it cannot be thought that they interfere materially with the muscular development, provided massage is employed. A simple corset to be applied can be made as follows: A cast is taken of the patient's trunk and hips under moderate extension. This can be taken in the recumbent or in the suspended position. The corset should be made from this cast, passing well down upon the hips. The corset can be made of cloth, leather, or stiffened paper, or a combination of these. The leather or cloth should be reinforced by steels. The object of such a corset is to exert a forward pressure on the back between the shoulders and on the lower portion of the sacrum, and a backward pressure over the abdomen. Such a corset can be made to furnish a downward pressure upon the trochanter. This can be aided by the use of perineal straps.

NOTE.—My personal experience in the treatment of congenital dislocation of the hip can be divided into three classes:

Class 1; the mechanical treatment; eight cases. In one the treatment was continued thoroughly according to the Guérin and Buckminster Brown method, with three years of recumbent traction, followed by a corset and apparatus. In none of these cases can the results be considered as satisfactory, and the treatment may be regarded as palliative. Several of the cases have been watched for eight years; and in one, the gait after treatment by massage and gymnastics is excellent, though considerable lordosis remains. One case, a girl of sixteen years, had undergone thorough treatment when a young child by recumbent traction and manipulation for several years with a supposed cure; a relapse after puberty had taken place at the time the patient presented herself to me.

Class 2; operations by the Hoffa method with the Langenbeck incision; six cases, two being double. Recovery from the operation in four. The ultimate results in these cases, however, were not satisfactory. One died five weeks after the operation, during an epidemic of naso-pharyngeal diphtheria, suppuration occurring in the wound before death. Death followed in another case in six weeks after recovery from the operation, with the wound healed, from scarlet fever; in a third case, a month after the wound healed, from an unknown cause, with dysenteric symptoms. In the three remaining cases, one being double, but little improvement followed in gait (although complete recovery from the operation took place), and the head was in all probability not thoroughly reduced into the acetabulum, as it did not seem firmly fixed, and some lordosis remained.

Class 3; five later cases. Operation performed by Lorenz's anterior incision. The head was reduced in four of these, one being at present under observation; in the fifth case, a girl of fifteen years, the head was not reduced, suppuration followed, the girl recovered with a useful but not improved limb.

Class 4; reduction by forcible manipulation; four cases. Two cases in which twelve years ago an imperfect attempt at forcible reduction by the Post method was made unsuccessfully; two later cases, one double, treated successfully. In one, of the age of seven, single dislocation, the reduction was performed by Dr. Dane employing the Lorenz method. In the second, a child of three years, with double dislocation, reduction was effected by means of forcible splint-traction.

Class 5; three adults (single dislocation) treated for attacks of severe muscular pain, treatment by means of rest, local application of heat, massage, electricity, and the temporary use of crutches. The patients recovered from the attacks after a period of discomfort varying from two weeks to six months.

CONCLUSIONS. Congenital dislocation of the hip is a dislocation of the head of the femur upward, occurring in uterine life.

A shallow triangular acetabulum results.

A diminution of the angle between the neck and the shaft takes place and there is a twist of the neck.

The capsule is altered by being stretched, thickened, first dilated in its upper portion, stretched across the acetabulum in the lower portion, and constricted at the rim of the acetabulum.

The most important obstacle to reduction lies in the attachment of the capsule displaced and thickened to the ilium above and around the front of the acetabulum, and to the anterior surface of the femur, especially to the lesser trochanter.

The shortened pelvi-femoral muscles also offer a resistance to reduc-

tion, and with the contracted capsule will prevent reduction or cause relapse.

Obstacles to the reduction of deformity also lie in the shape of the head and in the shallowness of the acetabulum.

Traction in a straight direction cannot effect a cure.

Traction in strong abduction with downward pressure upon the head may bring about reduction.

In children over two and under five years—in some instances between five and seven years—under an anæsthetic, forcible reduction can be successfully used. This can only be accomplished if the head of the femur is forced into and through the capsular neck dilating it, into the acetabulum, and only after the capsular attachments adducting and flexing the limb are thoroughly stretched.

Successful reduction is always accompanied by an audible movement of the head of the femur into the capsule; bandages and fixation apparatus are to be used to prevent relapse, until the contracted tissues are sufficiently long and the pelvi-trochanteric muscles have regained their power to a sufficient extent that a recurrence of the dislocation is impossible.

In cases older than seven and under fifteen years, and in some cases between five and seven years, an open incision is necessary for reduction of the dislocation.

The line of incision following the outer edge of the tensor vaginae femoris is the preferable incision.

Inability to reduce the head is due to capsular attachments from the acetabulum and ilium to the femur, which have not yet been divided or stretched.

In old adolescents, or adults, the operation where extensive alterations in the bones takes place, operative reduction has not been successful.

The use of corsets and traction splints may improve the attitude, but cannot cure.

NOTE.—In the earlier literature of congenital dislocation, the writings of Pravaz, Guérin, Carnochan, and Buckminster Brown are of interest. In contemporary literature, the following articles will be found of value :

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THE CUTANEOUS TUBERCULOSES IN CHILDHOOD.¹

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THE tuberculoses form part of the great class of granulomata, and, as the latter will recur constantly, it may be well to state that I understand by the term, infectious neoplasms. Childhood, for the purposes of this paper, ends with the fifteenth year.

For convenience, the subject may be divided into two classes:

I. Tuberculoses.

II. Paratuberculoses.

In the first the tubercle bacillus occurs in the tissues, in greater or less number; in the second no such finding has so far been made except in instances so rare that, for practical purposes, they are negligible, although occurring in persons who suffer from other manifestations of the disease.

I. TUBERCULOSES.

Four groups are usually described in this class, but a fifth must now be added. In order of frequency and importance they are:

1. *Lupus vulgaris*.
2. *Scrofuloderma*.
3. *Tuberculosis verrucosa*.
4. *Tuberculosis vera*.
5. *Miliary tuberculosis*.

Their symptomatology must be separately considered,² but etiology, pathology, prognosis, diagnosis, and treatment may, with a little ingenuity, be so arranged as to include the four varieties to be considered.

SYMPTOMATOLOGY. *Lupus vulgaris*, in a great majority of cases, begins in childhood. The site of predilection is the face, but the disease may be disseminated over the whole integument. The primary lesion is a soft, semi-translucent nodule, deeply situated in the derma,

¹ Read before the Pediatric Section of the American Medical Association.

² The scheme of treatment of this division of the subject is a modification of that used by Dr. Bowen in Morrow's "System of Dermatology."

showing through the epidermis the characteristic tint described by Hutchinson as that of apple-jelly. They may occur singly or in groups, the latter coalescing, and projecting later above the surrounding skin level. The plaque is soft, elastic and after a time begins to show a slight scaliness. Its growth is very slow, months, years even being required to form a patch one to two inches in diameter, and, as in many other instances, it is characterized by periods of quiescence and activity. Extension takes place peripherally by growth of the plaque

FIG. 1.



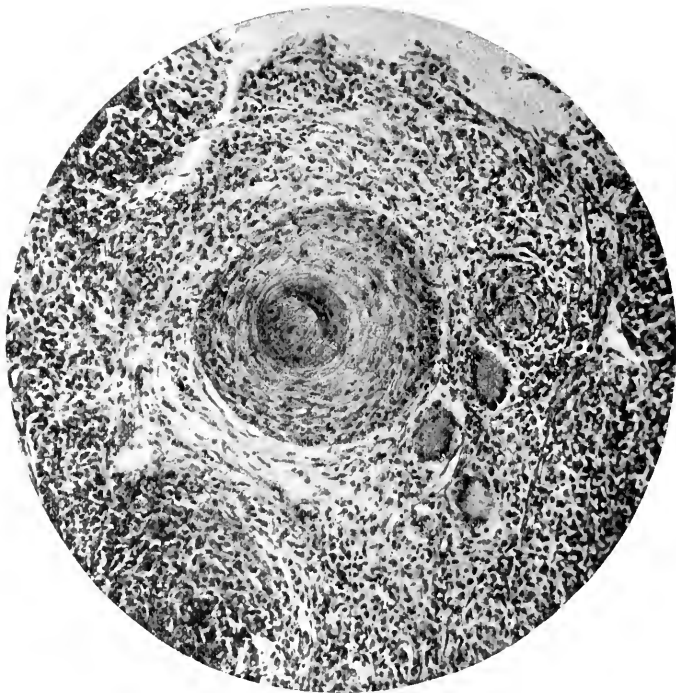
Lupus vulgaris, showing giant cells.

itself or the addition of new nodules. Ulceration is often a part of the process, taking place almost invariably when the disease attacks the various orifices, nose, and mouth. This necrosis may involve all the underlying structures except bone, which is never attacked, and great deformity, such as loss of the entire tip of the nose, may result. The disease has little tendency to spontaneous healing, but during the periods of inactivity fatty degeneration and absorption of the centre of the diseased mass may occur, leaving in time a thin, atrophic, parchment-like cicatrix surrounded by a border of disease.

Accessory factors, such as position, extent, amount of infiltration, the

soil and complications, give rise to variations in the type of the disease. Kaposi has applied the term *lupus disseminatus* to those cases in which the lesions are scattered, usually asymmetrically over the body. *Lupus ulcerosus* may become covered with thick, greenish crusts, and as a result of a mixed infection may fungate in the case of the nose, giving a cauliflower-like aspect. When firm oedema of the diseased tissue (lymph stasis) occurs in addition to lupus infiltration, the hypertrophic variety is seen. Its seats of predilection are the lips and buttocks. When instead or as a result of oedema the plaque becomes hard from

FIG. 2.



Lupus vulgaris, with growth of giant cells.

connective-tissue increase, we have *lupus sclerosus*. *Lupus acutus* is a term applied to the disease when the process is actively extending. Papillomatous lupus has been spoken of, and verrucous disease properly belongs to another category.

On the mucous membranes, which it involves in about 30 per cent. of cases according to the figures from Doutrelepout's clinic, the lesion is papillomatous, covered with gray, exfoliating epithelium. Implication of the mucous surface is rarely primary, usually by extension from the skin. The lips and palate are favorite sites for its development. Sharply-

defined ulcers, resulting from necrosis of the gray patches, are common, and cicatrization is apt to result in considerable deformity, not unlike that produced by ulcerating syphilides. It may involve the external auditory meatus, the lining of the pharynx, and the female genitalia.

Lupus may be complicated by various other tuberculous manifestations and by a systemic disturbance observed by Lespiannes (*Journ. des Mal. Cut.*, vol. iii. p. 531), very similar to that produced by injections of tuberculin. The symptoms are rise of temperature, bronchial and gastro-intestinal catarrh, and even endocarditis. It is possibly caused by toxin absorption. A grave complication of lupus in adults, epithelioma, has not been observed in children. It usually occurs in cases of long standing, and is rapidly fatal.

Scrofuloderma in modern terminology is restricted to the tuberculous lesions which develop in the subcutaneous tissue. It is usually the result of extension from neighboring foci of disease, lymphatic or osseous, and involves the skin only secondarily. It is doubtless as familiar to pediatricists as to those in dermatological practice, and I shall not stop to describe it here.

It is a long jump in point of frequency from lupus and scrofuloderma to the three remaining forms, in the adult; in children their rarity is such as to make them very nearly negligible quantities in diagnosis.

Tuberculosis vera is the name given by dermatologists to a form of tuberculous ulceration usually seen at the junction of skin and mucous membrane, as on the lips particularly, at the anus, nasal orifices, and vulva. It begins in the form of a papulo-pustule, which soon breaks down, forming a shallow ulcer with an irregular, undermined border and an uneven, grayish floor dotted with yellowish-white tubercles. It is usually covered with a thick crust. There is no tendency to healing; the process spreads peripherally until a maximum diameter of two inches is attained. The patients are usually cachectic, with evidence of tuberculosis in the internal organs. This ulceration occurs also on the mucous membranes, as of the tongue and larynx. A form of tuberculosis of the subcutaneous tissue, the scrofulous gummata (*gommes scrofulieuses* of the French), may be mentioned here, although it is more properly classed with scrofuloderma. It differs from the latter in originating in the subcutaneous tissue, not resulting from extension of neighboring foci of disease. Like scrofuloderma, it involves the skin secondarily. Tubercle formation begins in the connective tissue, the granuloma increasing in size until its diameter becomes an inch or more. The color is a livid, bluish red; the tumor is at first hard and freely movable under the skin, but later is attached to it, undergoes central necrosis, and may finally open outward, showing a deep, jagged ulceration. The gummata occur in strumous children, chiefly on the buttocks, back, thighs, and legs. Many of you have undoubtedly seen

the condition as a sequel of an acute exanthem, notably measles. It occurs as a secondary development in tuberculous lymphangitis.

Tuberculosis verrucosa (McCall Anderson's *scrofuloderma verrucosum*) in childhood is represented in my experience by two cases, both of which were seen in the New York Hospital. In this instance the result of the activity of the tubercle bacillus is not ulceration, but the papillary outgrowth which gives it its name. The primary lesion in adults, doubtless in children also, is the post-mortem wart, *verruca necrogenica*. There may be one or several lesions, the resemblance to an ordinary wart with the addition of a dull-red areola being very striking. Spreading peripherally, the growth may attain considerable size. Three border-zones in a fully developed patch can be made out, the outer erythematous merging gradually into the healthy skin, the middle dotted with minute pustules from which pus can be expressed, and the inner consisting of the warty outgrowths. The centre behind the advancing edge is usually flattened, and finally results by absorption of the diseased mass in atrophic scarring. In the two cases referred to the three zones were not present, warty outgrowths covering the patches scattered over face, trunk, and limbs.

Miliary tuberculosis, so far as the writer's knowledge extends, has been reported in one instance only,¹ but that is of sufficient interest to warrant a short review of its points. Leichtenstein's patient, a boy, aged four years (*Münch. Med. Wochenschr.*, 1897, No. 1, p. 1) developed first a pulmonary tuberculosis which became generalized, and of which he died. In the course of the fourth week a discrete papular eruption appeared on the trunk, face, and limbs. The lesions were small, hard, red, rounded or acuminate, and clearly marked off from the surrounding skin. Successive outbreaks occurred, lasting eight to fifteen days, when the papules would disappear. The number of lesions in each relapse was never more than twelve or fourteen, but the recurrences followed each other closely. The papules occasionally became vesicular or pustular, and after resolution left a desquamating surface.

ETIOLOGY. As in other microbial infections, the seed and the soil must be taken into careful account. The tubercle bacillus is the exciting cause of these five types of disease. Their clinical features depend on the individual peculiarities of the skin and system generally of the patient, perhaps to some extent, also, on the virulence and mode of inoculation of the micro-organism.

Lupus vulgaris, as a rule, begins in childhood; but the exceptions are quite numerous, the disease appearing sometimes late in life. The reason is found probably in the greater vulnerability of the skin in

¹ Since this was written Kaposi has reported several cases at the Twelfth International Congress.

early youth. Lupus progresses most rapidly then. Inoculation is usually indirect. The nodules, for example, may appear in the scars of scrofuloderma, at the borders of tuberculous fistule, and over diseased bones and glands. In the latter case, it sometimes happens that infection of the skin takes place through the lymphatics without involvement of the intervening tissues. Direct inoculation on tattoo marks, by ear-rings, etc., has been proved in a number of cases.

Tuberculosis vera and verrucosa are almost invariably the result of direct inoculation. The first, with the tuberculous ulcers of the mucous membrane, is an auto-infection from secretions swarming with bacilli which pass over them from the lungs, intestines, or genital organs. Verrucous tuberculosis usually results from hetero-inoculation, though the hands may be infected, for example, from the sputa or the penis in ritual circumcision. It is seen commonly in those who handle dead, tuberculous animal matter. Its occurrence in the two children referred to is difficult to understand. I have no theory to offer.

It may be said that no conclusive proof has hitherto been adduced of an increased proportion of cutaneous tuberculosis in the offspring of diseased parents. Congenital tuberculosis is at least extremely rare. Association with pulmonary infection, whether with or without a causal relation, is an accepted fact in a proportion too large to permit its being regarded as a coincidence. Leloir found it 98 times in 312 cases; Haslund in 60 per cent.

DIAGNOSIS. The salient characteristics of lupus are its beginning in childhood, its long and tedious course, the formation near the patches and in the scars of the peculiar apple-jelly nodules. It is most frequently mistaken for syphilis, and even with the aid of the microscope diagnosis is often impossible except after long watching of the case. The history and the therapeutic test, in the writer's opinion, are practically valueless. If the tubercle bacillus is found the question is settled; but the most patient search may go unrewarded. It is often said that the bacillus does not occur once in 200 sections. Lupus erythematosus is more superficial, does not ulcerate, and does not show the nodules. Verrucous tuberculosis may be confounded with common warts, with syphilis, and eczema. The microscope will make the diagnosis with ease in the first case; its course and the clinical features enumerated, in the second; an eczema never leaves a scar, and spreads by peripheral extension, not by development of new lesions in the neighborhood. Lepra and sarcoma might be confounded with cutaneous tuberculosis. Tuberculous ulcerations are distinguished from syphilitic by their slow development, the presence of miliary tubercles and of the tubercle bacillus.

Culture experiments and the microscope furnish exact methods of diagnosis in the forms where the bacillus occurs in numbers—*i. e.*, in

serofuloderma, verrucous, ulcerative, and miliary tuberculosis, but the case is different in lupus vulgaris. Not only are the histological features very similar to those of certain superficial syphilodermata, but bacilli occur so sparsely that culture almost always fails. Reliance is best placed on the points given.

PATHOLOGICAL ANATOMY. The lesions of all the types are neoplasms of granulomatous character. Kaposi's description of the histopathology of lupus still remains the best. The nodule begins in the deeper part of the corium, and consists of cells, leucocytes, and proliferated connective-tissue corpuscles, embedded in a delicate fibrous reticulum, supplied by numerous, dilated vessels. The infiltration later becomes more dense, giant cells appear, the blood-supply is cut off by pressure, and central necrobiosis takes place. The result of this tissue death is absorption and atrophic scarring, or, in case extension has involved the epidermis, ulceration. The foci usually spread along the course of the vessels. When the epidermis is involved the prickle cells proliferate and the interpapillary projections are widened and lengthened. The boundary line disappears gradually and, by tissue loss through desquamation or suppuration, ulceration occurs. When connective-tissue proliferation takes place lupus sclerosus develops; when the papillae enlarge a verrucose condition results; occasionally epithelial proliferation is excessive, and it is in this way that epithelioma begins. Tubercle bacilli are to be seen, but very few in number and usually within the giant cells. When found after a search through 100 sections or more, they are often single or occur in twos and threes.

In the four other varieties the pathological findings do not differ greatly from each other. The greater portion of diseased material is granulation tissue composed of leucocytes, epithelioid, and giant cells. Tubercle bacilli occur in great number in all of the lesions, from which they may easily be cultivated and inoculated. Serofuloderma is a tuberculosis of the subcutaneous connective tissue. The tubercles coalesce, invade the corium and epidermis, ulcerating finally by cell necrosis through the latter. Tuberculosis vera is exactly the same process beginning more superficially and progressing more rapidly. The latter bears close analogy to miliary tuberculosis elsewhere.

In verrucose tuberculosis the corium is invaded by the same granulation tissue, but there is a tendency to epidermic proliferation rather than ulceration. The papillae are greatly elongated and broadened, with corresponding hypertrophy of the interpapillary prolongations. The surface is covered by thickened layers of horny cells which, following the dipping between the papillae, give rise to the appearance of verrucosity. Here and there, where epidermic proliferation is greatest, may be seen minute pustules. When present they finally burst superficially, and the pits left become filled with horny masses of epidermis.

The number of tubercle bacilli is greater than that in lupus, less than in tuberculosis vera.

In the single case of miliary tuberculosis the papules were found to consist of tubercles situated in the papillary layer and containing numerous bacilli. A secondary infection by pus-organisms accounted for the pustulation.

PROGNOSIS. This is more or less unfavorable in all forms. In tuberculosis vera and miliaris the danger is to life itself, since they may justly be regarded as part of a grave systemic infection. All forms are rebellious to treatment, prone to relapse, and show no tendency to spontaneous healing. A scar is, moreover, the invariable result with the best of treatment. Left untreated, the disease may continue and progress indefinitely. Prognosis is modified by the variety: lupus is much more difficult to cure than scrofuloderma or verrucous tuberculosis. Possibility of general infection from the skin lesion should always be borne in mind.

TREATMENT. Specific treatment in the shape of tuberculin may be dismissed, it may be said, with little fear of contradiction, as a complete failure at present. I have never seen the remotest good result from its use. Prophylaxis should not be neglected. Those who have a tendency to the development of tuberculosis should be hedged about by every hygienic precaution; the skin should not be exposed to contact with the virus, and should be antiseptically cleansed when so exposed; it should be protected when possible by destruction of underlying disease. There is no need to dilate upon the necessity for general hygienic and therapeutic measures. These are the same and equally important in the skin as in other organs.

Chief reliance must, after all, be placed on local treatment. It may be summed up in one word—removal. The means to that end are limited only by the bounds of human ingenuity. The ideal method, advocated by Lang, of Vienna, is *excision* and grafting; but, unfortunately, this is limited to small areas, and the disease is apt to return even then. *Curetting* with a Volkmann spoon or curette offers certain advantages, notably the aid to the operator, in the feeling of resistance given by healthy tissue. It is most useful in large areas, and should then be done under general anæsthesia. *Linear scarification* may be done with local anæsthetics by means of a single blade or a scarificator consisting of several parallel cutting edges. While not curative in itself, this method offers advantages as an adjunct to other treatment. The scarifications are done in parallel lines and crossed at right angles. It is useful in locations, lips or ears, difficult of access to other means. A further advantage is that it produces a soft, supple cicatrix; objections to it are the long duration of treatment and possibility, in common with other surgical methods, of general infection through lymph chan-

nels. It is particularly applicable in lupus sclerosus. *Cauterization* may be done with the Paquelin or electro-cautery, or by chemicals. The first is useful in large areas; the second, in picking out single nodules deep in the cutis or recurring in a cicatrix. *Chemical cauterization* is a method not in great vogue in this country. Arsenical pastes, Vienna or Marsden's, destroy the diseased parts, but should not be used over areas greater than one and a half inches square. They are excessively painful. Silver nitrate in solution or solid may leave a permanent stain in the skin. It is impossible to limit the action of zinc chloride; salicylic acid is useful only to remove thickened epidermis; carbolic acid has no value. Pyrogallie acid (paste, 10 per cent.) acts only upon foci of disease. *Electrolysis* may be used to destroy isolated lesions.

Success in treatment is largely a question of the skill shown in selection and carrying out of the method. No single mode can be followed successfully, and often resort must be taken to all in one case before success is assured. For example, a large ulcerated plaque of lupus on the cheek or tuberculosis verrucosa on the hand may be curetted thoroughly and the actual cautery applied to the pockets of disease. The wound may be dressed antiseptically or covered with a layer of pyrogallie ointment (there is danger of intoxication from the latter if too large a surface be attacked). The acid destroys disease which has escaped the scraping and cauterization. When a clean surface is secured it is allowed to granulate, plasters (mercury) or the solid stick restraining exuberant granulation. After the scar has formed it may be scarified to make it soft, and recurrences may be destroyed by electro-cautery or electrolysis. Fortunately, we have now at hand a means of reducing the hideous, puckered cicatrices of cutaneous tuberculosis in thiosinamin. A 10 per cent. solution in glycerin and water is injected hypodermatically every second or third day in 10-minim doses.

II. PARATUBERCULOSES.

In 1894 Fournier published in Paris a book which he called *Les Affections Parasyphilitiques*. By the term he means affections not necessarily syphilitic in themselves, but developing and flourishing upon a specific basis. The step is not far from syphilis to tuberculosis in pathology, and by analogy it is not strange that there should be a crowd of diseases with a thoroughly recognized relationship to the latter, in spite of the fact that Koch's bacillus is only very rarely found in their lesions, even then probably resulting from accidental contamination. Many efforts have been made of late to find and fix a place for the paratuberculozes, notably during the Congress of Dermatologists last year in London, by Hyde, Hallopeau, Crocker, and others. (The name I have used was not suggested—in fact, none was given—but it seems to fit the case.)

Very few dermatologists are ready to accept as corollaries to tuberculosis all the diseases so designated by Hyde and Hallopeau. Tommasoli appears to have the right of the question when he says that it is a mistake to consider that dermatoses, such as Hebra's pityriasis rubra, general ichthyosis, dermatitis exfoliativa, eczema even, have any causal relationship with tuberculosis other than that, in the impairment of the resisting powers following a long-standing disease of this kind, the bacillus finds its entrance easier and its soil more favorable. Upon one point, although the guess is at present a hazardous one, opinions, in a majority of observers, are apparently agreed, viz., that the origin of the diseases commonly accepted as paratubercular is toxic. They are, in all likelihood, due to the action of poisons derived from distant foci of disease.

For convenience, those diseases concerning whose title to a place here there is little dispute may be ranged in three subdivisions: (1) the scrofulides; (2) the tuberculides; and (3) hyperchromia. The scrofulides, first described by Duhring, are pyodermic affections which, if toxic in origin, are so probably in the sense that pus organisms are more easily inoculated upon a skin weakened in resisting power by circulating poisons. In this scheme they include:

- a. The small pustular scrofulide.
- b. The large pustular scrofulide.
- c. Certain suppurative folliculites.

The second subdivision, called tuberculides by Darier, includes, in his classification, a number of affections which may be narrowed to

- a. Lichen scrofulosorum.
- b. Acne cachecticorum.
- c. Erythema induratum scrofulosorum.
- d. Grouped folliculitis.
- e. Possibly the disease usually described as hydradenitis.
- f. Lupus pernio.

The first three are typical paratubercloses. Kaposi says one of the diagnostic points in lichen scrofulosorum is its occurrence in the tuberculous. The origin of *d* and *e* is more than doubtful. None of these diseases are commonly pustular, but they may become so by accidental contamination. In this way they are separated from the scrofulides, which are pure pyodermias.

The last class includes but one affection, a hyperpigmentation, a "pigmentary dysgenesis" common to various cachexias, of syphilis, cancer, paludism, alcoholism, diabetes, as well as of tuberculosis. In this instance it may aptly be called the pigmentary tuberculide in analogy with the pigmentary syphilide. Fournier (*Les Affections Parasymphilitiques*) describes a case¹ in a young girl, which could be distin-

¹ Some eighteen others have been reported by various observers.

guished from the specific dyschromia only with the greatest difficulty. The pigment is derived from the blood originally, but its chemical composition is changed. Once deposited in epithelial cells, for which it has a special predilection, it is practically ineradicable.

None of the paratuberculosos are common in practice. I shall consequently describe briefly only the scrofulide, lichen scrofulosorum, and erythema induratum. Their importance lies in the fact that they are easily mistaken for syphilides, as pointed out by Hutchinson.

The members of the first group rarely occur singly in a pure state. The eruption is generally constituted of large and small pustules, frequently beginning as a perifollicular inflammation. Moreover, they are often seen complicating the tuberculides. The initial lesion may be a papule, but is usually a vesico-pustule. They may be large or small, follicular or not, grouped or irregularly scattered over the back, buttocks, legs, thighs, and arms. When large, the pustules may coalesce and become covered with thick crusts. Whether large or small a depressed cicatrix is apt to result. The course is slow and indolent. Stanley (*Brit. Journ. of Derm.*, Nov., 1893) published a case, a boy aged fourteen years, in whom the eruption was recurrent and displayed its greatest activity when tuberculosis of the cervical glands was most active. The patient progressed favorably under cod-liver oil internally and externally by innunction.

Lichen scrofulosorum is the type of the paratuberculosos. It occurs almost invariably in tuberculous patients, and very rarely does the bacillus appear in the lesions. The controversy over its presence, according to Pellizzarri, arises from the fact that the toxins prepare the soil for its entrance. No improvement has been made on Hebra's original description. The eruption is extremely chronic, and consists of grouped, small, firm, flat, livid-red papules disseminated over the back, abdomen, and thighs. They may be capped by a fine scale or a tiny pustule. At first they are isolated, but become closely grouped later. The patches are not large, and may have a crescentic outline. In Austrian statistics 99 per cent. of cases showed other evidences of struma. The affection is encountered between infancy and puberty, never after the twentieth year. The papule is formed by an inflammatory infiltration about the pilo-sebaceous follicle. On involution it leaves pigmentation or faint scars.

Colecott Fox (*Brit. Journ. of Derm.*, Nov., 1895) has described several cases of a disease which he called "acne scrofulosorum in infants," and which is in all probability identical with Hebra's acne cachecticorum. His description is as follows: "The eruption is an indolent, small, papulo-pustular or acneiform one in infants, disseminated sparsely and without grouping and unaccompanied by subjective symptoms. It affects the lower limbs and buttocks, chiefly on their extensor surfaces.

The lesions appear successively or by a subacute outbreak. The papules are inflammatory, seated about a hair-follicle and acuminate in the early stage. They mostly develop a crown of pus, . . . and in involution become flattened and leave stains or scars." This is not very different from the lichen just described. In fact, as I have said, they and the pustular scrofuloderm may flourish on the same soil.

Erythema induratum (Bazin's *erythème induré des scrofuleux*) is an interesting affection, not so uncommon as the others. I cannot do better than describe one of my own cases, which is typical of the milder form. The patient was a girl, aged twelve years, of unhealthy appearance and with enlarged cervical glands. The father had a history of tuberculosis. The skin of the lower extremities was of a livid color, cold and œdematous. Here and there, chiefly on the anterior aspects, were numerous nodules, some projecting above the surface, others only to be felt beneath it. Over the larger the skin showed a reddish tint and one had spread externally by a small punched-out mouth through which a thin pus was discharged. The disease was painless and indolent, with little tendency to healing. In graver cases multiple ulcers are formed, the openings of which may be connected by subcutaneous fistulae. In my case the disease began at puberty. She recovered under tonic treatment and local antiseptics.

In conclusion, let me urge members of the profession to report the cases of cutaneous tuberculosis which they see in practice, of whatever kind. They are very few in dermatological clinics, and much light is needed upon the subject still, particularly in the case of the paratubercloses.

HEREDITY IN PHTHISIS.

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ON December 11, 1894, I read a paper before the Royal Medical and Chirurgical Society of London on "The Influence of Heredity in Phthisis," in which I compared the incidence of this disease on the children of phthisical parents with that on the children of non-phthisical parents living under similar conditions. In that paper I showed that in 275 families in which there was no phthisis in the parents, comprising a total of 1745 children, 24.87 per cent. of these became phthisical; while in 199 families of phthisical parents, with a total of 1182 children, 33.71 per cent. of the children became phthisical. This gives a difference of only about 9 per cent.

I pointed out that this comparatively small excess in the incidence of phthisis on the offspring of phthysical parents might well be accounted for by the greater exposure to infection of those whose parents were phthysical, since these were living with infected persons.

The general argument was, briefly stated, as follows: The children of parents who are in poor health—whether from phthisis or because of unhygienic surroundings or from any other cause—are likely to be themselves weakly, and thus predisposed to contract any disease to the infection of which they may be exposed. If the ill-health of the parents is due to phthisis, their delicate children, being constantly exposed to the infection of tuberculosis, are liable to become tuberculous. They do not *inherit* tuberculosis, but are more exposed to infection of this disease than those who do not live with consumptives.

If this view be correct, its importance from the point of view of prophylaxis is considerable.

I have now completed the statistical examination of 1000 families—a sufficient number to give some value to the result, since these families comprise over 6400 children. In this paper I propose to analyze the figures obtained from the 526 cases tabulated since my last paper was published and the results of the total of 1000 families. For the sake of comparison, and to give completeness, I have drawn out tables (III. and IV.) showing the results given in the Medico-Chirurgical paper (correcting one or two errors which escaped notice in revising the proofs for publication) side by side with the figures of this second series and the total for the two series combined. The results obtained from this larger number of cases will be seen to differ but slightly from the figures published in 1894.

The influence of heredity in the causation of tuberculosis, and especially in the causation of consumption, has been held to be very great. So powerful has this influence been considered that it has been used as an argument against the proposals for prophylactic measures which are advocated by sanitary officers and others. The members of consumptive families also have felt that escape from the disease is well-nigh impossible, and meet suggestions for prevention with the reply, “It is no good in my taking precautionary measures; the disease is in my family.” Nevertheless, it seems to me that the facts about heredity in consumption, properly considered and understood, furnish a strong argument in favor of prophylactic measures against tuberculosis. I have on previous occasions expressed the belief that the influence of heredity in tuberculosis has been overestimated, and that among the general public the nature as well as the extent of this influence is misunderstood. It is clearly the duty of the medical profession to educate the public on matters affecting disease-causation, so that preventive means may be accorded the approving help of the public instead of

being met with the obstruction or apathetic indifference with which ignorance receives all prophylactic suggestions and regulations. In tuberculosis especially is it essential that attempts at prophylaxis should be seconded by the public. Without such co-operation the medical profession can do little or nothing; with the intelligent and willing help of all concerned tuberculosis may be practically stamped out and consumption become as rare as smallpox is now. One great obstacle to the general acquiescence in measures directed against the spread of tuberculosis is the widespread belief in the hereditary nature of consumption. Statistics are proverbially unreliable, and statistical evidence has been used to illustrate the influence of heredity in consumption. I shall make use of this same uncertain weapon to combat the inferences generally deduced from the statistics of heredity; and if I am told that my figures *prove* nothing, I am content to accept this criticism, for my object is in part obtained by showing that statistical evidence—whatever it may be worth—is not without exception in favor of the strong influence of heredity in phthisis. With regard to my figures, it may be argued with justice that the information obtained from patients as to the medical history of other members of their families is unreliable; yet the same sources of fallacy exist in the cases where the parents were consumptive and in those in which the parents were non-phthisical, so that a comparison between the two classes may still be a fair one. It is because this element of uncertainty in the correctness of the medical history makes any pretension to scientific accuracy impossible in such an inquiry as this that I have preferred to use such indefinite terms as “consumption” and “phthisis” rather than the more exact expression “pulmonary tuberculosis.” Before reviewing the figures which I have to submit let us briefly examine the nature of some of the evidence of hereditary influence. The chief argument in favor of the powerful influence of heredity is that in so many cases of tuberculosis one or other of the patient’s parents suffered from the same disease, or that the disease affected the grandparents, uncles, aunts, or cousins. In many of the cases where the parents were phthisical it would be found that they did not become so until after the birth of the patient; and in these cases, as in those where the parents were never affected, atavism is brought forward to explain the hereditary transmission of the taint. Something more, however, than the occurrence of a particular disease in several members of successive generations of a family is required to establish heredity, or we might consider measles an hereditary disease. Congenital tuberculosis—tuberculosis in the fetus or newly-born children—is so rare that the hereditary influence cannot be considered to take the form of direct transmission of the disease. To bring the later onset of the disease into line with the theory of heredity we require to imagine an exceptional period

of latency in tuberculosis, which is still only a supposition. If the disease were implanted in the fœtus, remaining latent until called into activity by some accident, we should not expect it to remain inactive through the period of teething and the various ailments of childhood only to declare itself in early adult life—the period when consumption most commonly commences. Evidently, then, it must be a *tendency* to the disease which is transmitted, not the disease itself; and if we can show—as has frequently been shown—that this tendency may be counteracted, we have a powerful argument in favor of the employment of prophylactic measures. Granting that the members of a consumptive family have a special tendency to tuberculosis, which tendency can be counteracted and removed by certain means, how can we hesitate to employ these means when the disease to be prevented is so fatal?

But, as I attempted to show in my paper at the Royal Medical and Chirurgical Society, in 1894, it is not certain that any specific tendency to tuberculosis is transmitted. It is possible—and, as I think, probable—that what is transmitted by consumptive parents is a want of strength to resist illness of any kind; a general delicacy of constitution which renders the individual a ready prey to any disease. Such a person living with a consumptive (it may be a parent) is likely to become consumptive, not because of any specific tendency, but because, being constitutionally non-resistant, he contracts the disease to the infection of which he is exposed, and in this case it is tuberculosis. Some support for this contention may be found in comparing the proportion of cases in which heredity is claimed among 1000 hospital patients and among 1000 private patients. In the first report of the Brompton Consumption Hospital, out of 1010 patients of the poorer classes one or both of the parents were phthisical in 242 cases, or 24 per cent. Among the private patients (well-to-do persons) of Dr. Theodore Williams—one of the physicians to the Brompton Hospital—1000 cases gave a history of phthisis in the parents in 120 instances, or 12 per cent.—only one-half of the proportion found among the poorer patients. Either heredity is not a potent influence—otherwise it would affect both classes equally—or the hereditary influence is counteracted by healthy living. Either inference gives hope for preventive medicine.

But even the limited influence of an inherited tendency does not appear to me to be so great as would appear from the statistical expression of heredity in consumption which is usually employed. It is commonly stated that an hereditary influence may be found in from 25 to 30 per cent. of all cases of consumption if inheritance from parents alone is taken into consideration, and in about 60 per cent. when phthisical grandparents, etc., are considered.

In the paper already referred to I collected from various sources the following figures: Out of 12,509 cases of consumption the parents were also phthysical in 3101 cases, giving a "percentage heredity" of 24.79. In 12,146 consumptives there was a history of phthisis in the family (parents, grandparents, uncles, or aunts) in 7563, or a "percentage heredity" of 62.34. But in all these cases the figures were arrived at by getting from the patient the history of the preceding generation of the family, and wherever consumption had occurred in even one member of the family the case was classed as an instance of heredity. We only require to carry the family history back another generation or two to find some "hereditary influence" in almost every case. That this method of inquiry gives a misleading idea of the influence of heredity I endeavored to demonstrate, and set myself to work out the hereditary influence in a different manner. Starting with the consumptive individual, I traced his offspring instead of his ancestors, and noted how many of his children subsequently became phthysical and how many remained free from tuberculosis. This led to a somewhat unexpected result, for the figures by which the percentage heredity was now expressed—viz., 33.71—were closely similar to those obtained by the other method of inquiry, viz., 32.5. We may conclude, therefore, that among the class from which these patients are derived—the poorer classes, who make use of hospital assistance—about one-third of the offspring of consumptive parents will subsequently become tubercular, and that in about one-third of the cases of consumption among such classes we shall find a history of phthisis in the parents.

This, however, is far in excess of what Dr. Theodore Williams found among his private patients. I then checked my results by an inquiry into the proportion of the offspring of non-phthysical parents, in the same condition of life as my other cases—*i. e.*, hospital patients—who eventually became consumptive. In this way I obtained a numerical expression of the influence of occupation and mode of life, for in these cases the influence of heredity was absent.

Clearly, also, the influence of the consumptive parent in the causation of phthisis in his offspring (whether this influence be hereditarily transmitted or not) would be expressed by the increased incidence of consumption on the offspring of phthysical parents, all the cases being drawn from families in the same station of life.

This is shown in the following table (Table I.).

TABLE I.—SHOWING THE INCIDENCE OF PHTHISIS IN THE CHILDREN OF NON PHTHISICAL AND OF PHTHISICAL PARENTS RESPECTIVELY.

1000 families.	Children.		Died in infancy.		Phthsisal.	
	Total number.	Proportion to each family.	Total number.	Per cent of whole.	Total number.	Per ct. of children omitting infantile deaths.
A. 673 families with <i>no</i> phthisis in the parents	4488	6.66	522	11.63	938	23.65
B. 143 families. Father phthsisal	925	6.25	126	13.62	249	31.16
C. 135 families. Mother phthsisal	826	6.11	78	9.44	215	32.75
D. 41 families. Both parents phthsisal	218	4.95	28	12.84	82	43.15
Summary of B, C, D, 327 families. One or both parents phthsisal	1969	6.02	232	11.78	576	33.16

As will be seen from these results of inquiries embracing 1000 families this table shows :

Percentage of the offspring of <i>phthsisal</i> parents subsequently becoming tubercular	33.16
Percentage of the offspring of <i>non-phthsisal</i> parents subsequently becoming tubercular	23.65
Percentage of influence due to parents, or "percentage heredity"	9.51

We may then take it as demonstrated that consumptive parentage affects less than 10 per cent. of the offspring.¹

But how much of this comparatively small excess of phthisis in the offspring of consumptives may properly be put down to heredity is still open to question. We know that tuberculosis depends upon the presence within the body of the bacillus tuberculosis; and while the direct transmission of the micro-organism from the parent to the *fetus in utero* is almost unknown, there is abundant evidence that the bacillus may gain entrance into the body from without, in the air and in the food, as well as in other ways. Probably the great majority of persons now hold the opinion that infection is the chief factor in the causation of tuberculosis. I would express the matter by stating that infection is the only essential factor in the causation of tuberculosis; but, though the most robust may become tubercular if exposed for some time to intense infection, there are certain conditions which render a person liable to become infected from even a slight degree of infection. Of these predisposing causes, inherited weakness of constitution is one. That such inherited predisposition may be counteracted is shown by

¹ It is interesting to note how nearly this agrees with the percentage heredity given by Dr. Theodore Williams for his private patients, who were free from the adverse influence of occupations and surroundings which affect the hospital patients.

many well-known cases—such as the family record by Dr. Hermann Weber, in the Croonian Lectures for 1885—and is also evidenced by the fact that two-thirds of the offspring of consumptives escape the disease. But when an individual with inherited delicacy is living in a close and intimate relation with a consumptive there is so great a risk of infection that the extra 10 per cent. of consumptives in the offspring of tubercular parents—as shown in my figures—may easily be thus accounted for.

TABLE II.—SHOWING THE INCIDENCE OF PHTHISIS ON THE TWO SEXES IN THE CHILDREN OF NON-PHTHISICAL AND OF PHTHISICAL PARENTS RESPECTIVELY.

1000 families.	Children.		Died in infancy.		Phthysical.	
	Total number.	Proportion to each family.	Total number.	Per cent of whole.	Total number.	Per cent of children omitting infantile deaths.
A. 673 families with <i>no</i> phthisis in the parents	M. 2448 F. 2040	3.63 3.03	310 212	12.66 10.39	565 373	26.24 20.40
B. 148 families. Father phthi- cal	M. 475 F. 450	3.20 3.04	69 57	14.52 12.66	110 139	27.09 35.36
C. 135 families. Mother phthi- cal	M. 399 } F. 420 }	(2.95) (3.11)	41 } 30 }	(10.27) (7.14)	126 119	35.19 30.51
D. 44 families. Both parents phthi- cal	M. 108 F. 110	2.45 2.50	15 13	13.88 11.81	40 42	43.01 13.29
Summary of B,C,D, 327 families One or both parents phthi- cal	M. 982 } F. 980 }	(3.00) (2.99)	125 } 100 }	(12.72) (10.20)	276 300	32.20 34.09

When we examine the incidence of the disease on the two sexes under the various circumstances (Table II.) we see again further reason to attribute the excess of consumption in the offspring of phthi- cal parents, not to heredity, but to infection. Among the offspring of the non-phthi- cal parents it is the males who become consumptive in greater proportion. In this case we see the influence of occupation and the greater risk of infection to those who go out into the world over those who remain at home. When, however, there is phthisis in one or both of the parents, we see the extra risk to those who remain at home, shut up, so to speak, with a consumptive. It is among the female offspring of phthi- cal parents that the disease shows itself in greater proportion, the exposure to infection at home outweighing the risks of occupation and exposure at work. We note that the incidence of phthisis among the male offspring of phthi- cal parents (32.2 per cent.) is about six per cent. more than that among the male offspring of non-phthi- cal parents (26.4 per cent.); while among the

¹ In over seven sex not stated.

female offspring nearly 14 per cent. more become consumptive among those belonging to phthysical families (34.09 per cent.) than among the children of non-phthysical parents (20.4 per cent.). Does not this furnish a strong argument in favor of infection, rather than heredity, as the means of transmission from parent to child? The consumptive father goes out to his work during the earlier part of his illness, and is therefore not so much in contact with the other members of the family. The mother is always at home, and so becomes a constant source of infection to the family from beginning to end of her illness. The effect of this is seen in the increased incidence of consumption when the mother is phthysical. When both parents are consumptive the risk of infection is materially increased, and the proportion of the offspring who become phthysical is large. Not only is infection intense, but the non-resistance of the offspring is greater when both parents were weakly.

There are many other interesting deductions which might be made from these figures, but I am unwilling to obscure my main argument by following up side issues. There is, too, a danger of utilizing figures to prove preconceived theories. I commenced this inquiry without any special theory of the hereditary influence in phthisis, and was led to question the potency of direct heredity by my figures. I am, therefore, the more anxious to avoid the attempt to make my figures prove too much.

TABLE III.

	Children.		Died in infancy.		Phthysical.		
1000 families.	Total number.	Proportion to each family.	Total number.	Per cent. of whole.	Total number.	Per ct. of children omitting infantile deaths.	
A. Parents non-phthysical.							
Med. Chir.	275	1745	6.31	193	11.06	386	24.87
Second series	398	2743	6.89	329	11.99	552	22.86
Total	673	4488	6.66	522	11.63	938	23.65
B. Father phthysical.							
Med. Chir.	84	511	6.08	67	13.11	138	31.08
Second series	64	411	6.46	59	14.25	111	31.26
Total	148	925	6.25	126	13.62	249	31.15
C. Mother phthysical.							
Med. Chir.	82	506	6.17	56	11.06	155	34.44
Second series	53	320	6.03	22	6.87	90	30.20
Total	135	826	6.11	78	9.44	245	32.75
D. Both parents phthysical							
Med. Chir.	33	165	5.00	18	10.90	58	39.45
Second series	11	53	4.81	10	18.86	24	55.81
Total	44	218	4.95	28	12.84	82	43.15
Summary of B, C, and D.							
Med. Chir.	199	1182	5.93	141	11.92	351	33.71
Second series	128	787	6.14	91	11.56	225	32.32
Total	327	1969	6.02	232	11.78	576	33.16

TABLE IV.

1000 families.	Children.		Died in infancy.		Phthisical.	
	Total number.	Proportion to each family.	Total number.	Per cent. of whole.	Total number.	Per ct. of children omitting infantile deaths.
A. Parents non-phthisical.						
Med. Chir. 275	M. 947	3.44	111	11.72	244	29.18
	F. 798	2.90	82	10.27	142	19.83
Second series . . . 398	M. 1501	3.77	199	13.25	321	24.65
	F. 1242	3.13	130	10.46	231	20.77
Total 673	M. 2448	3.63	310	12.66	565	26.42
	F. 2040	3.03	212	10.39	373	20.40
B. Father phthisical.						
Med. Chir. 84	M. 267	3.17	39	14.60	62	27.19
	F. 244	2.90	28	11.47	76	35.18
Second series . . . 64	M. 208	3.25	30	14.42	48	26.96
	F. 206	3.21	29	14.07	63	35.59
Total 148	M. 475	3.20	69	14.52	110	27.09
	F. 450	3.04	57	12.66	139	35.36
C. Mother phthisical.						
Med. Chir. 82	M. 246	3.00	33	13.41	84	39.43
	F. 260	3.17	23	8.84	71	29.95
Second series . . . 53	M. 153 ¹	(2.88)	8 ¹	(5.22)	42	28.96
	F. 160	(3.01)	7	(4.37)	48	31.37
Total 135	M. 399 ¹	2.95	41 ¹	(10.27)	126	35.19
	F. 420	3.11	30	(7.14)	119	30.51
D. Both parents phthisical.						
Med. Chir. 33	M. 84	2.54	12	14.28	28	38.88
	F. 81	2.45	6	7.40	30	40.00
Second series . . . 11	M. 24	2.18	3	12.50	12	57.14
	F. 29	2.63	7	24.13	12	54.54
Total 44	M. 108	2.45	15	13.88	40	43.01
	F. 110	2.50	13	11.81	42	43.29
Summary of B, C, and D.						
Med. Chir. 199	M. 597	3.00	84	14.07	174	33.91
	F. 585	2.93	57	9.74	177	33.52
Second series . . . 128	M. 385 ¹	(3.60)	41 ¹	(10.64)	102	29.65
	F. 395	(3.08)	43	(10.88)	123	34.94
Total 327	M. 982 ¹	(3.00)	125 ¹	(12.72)	276	32.20
	F. 980	(2.99)	100	(10.20)	300	34.09

I am content to claim that—as shown by the small difference between the incidence of consumption on the offspring of phthisical and non-phthisical parents, respectively—the direct influence of heredity is comparatively small, and is, at any rate, considerably less than has been generally believed.

If this contention is accepted, I shall have the satisfaction of having done something toward removing one great argument against the practical utility and probability of success in prophylactic measures directed against tuberculosis. Once let a parent recognize that it is by *infection* and not by *inheritance* that he may be a danger to his children, and it will not be difficult to persuade him to take precautions against spreading the disease. Thus, prophylactic measures will be easily introduced into the household where sanitary inspectors cannot penetrate.

¹ In over seven sex not given.

OTITIC EPIDURAL ABSCESS IN THE MIDDLE CRANIAL FOSSA
ASSOCIATED WITH ABSCESS OF THE TEMPORAL
LOBE OF THE BRAIN.

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ON June 30, 1897, I was asked by Dr. H. R. Wharton, one of the surgeons of the Presbyterian Hospital, to see with him a man, G. J. S., aged thirty years, who had been admitted to the hospital the previous night, where he had been brought in a semi-comatose condition, with a temperature of 99° F. We found him in bed, without any pain, but in a dazed condition of mind. He seemed to understand our questions, but was unable to give answers to them. If asked how he felt, he would shake his head affirmatively, and if we said "better?" he would then say, in a low tone, "better." When asked to put out his tongue, he would simply open his mouth, but could not protrude his tongue.¹ His tongue and teeth were covered with brownish sordes. His appetite was fair, his digestion good, and his bowels not constipated.

We learned from his wife that he had had a chronic purulent discharge from his left ear since childhood, and that he had been in the habit of picking at it with pins, etc., in order to cleanse it and free it from odor. On June 20th, ten days previous to admission, he complained of earache and toothache on the left side, and had had a tooth drawn to obtain relief from pain. The earache and discomfort in that region continued, however, and on June 23d, he came home from his work (that of a hall-man in a club) complaining of pain in his left ear, headache, and nausea, and finally he vomited and then went to bed, because too ill and weak to be up. His family physician was called in, and at first prescribed for a cold. By June 27th the patient felt better, and in the afternoon he sat up in bed an hour, between three and four o'clock. About 5 p.m., the same day, he became suddenly unconscious while lying in bed, and remained so until, at 7 p.m., he had a heavy, general convulsion, and at 9 p.m. he had another convulsion, but a less severe one. From this time until brought to the hospital in the evening of June 29th, he remained semi-comatose and paraphasic.

When examined by Drs. Wharton and Burnett on June 30th, at 11 A.M., the patient complained of nothing, and looked entirely comfortable. He was markedly paraphasic, and was not fully conscious of all that was going on around him.

There was no redness, tenderness, nor swelling anywhere about the ear or cranium, and there was *no* discharge from the ear. Inspection of the auditory canal revealed a large granulation at the meatus. This was removed with forceps, and the further inspection of the ear showed a loss of the membrana tympani, a red and sensitive promontory, a large, flabby granulation protruding from the tympanic antrum into the auditory canal, and a large perforation into the attic. These last-named cavities felt carious, but were entirely dry.

¹ Dr. Sinkler informs me that he has seen such inability to protrude the tongue in connection with tumor in the temporal lobe.

The carious condition of the attic, aditus, and antrum, the previous history of chronic otorrhœa, the recent attacks of pain in the ear, with convulsions a few days previous to admission, and the marked sensory aphasia of the patient, inclined us to make a diagnosis of a purulent focus of otic origin in the middle fossa of the cranium over the tegmen tympani, involving the temporal lobe and speech-centres, although the patient had had no subnormal temperature nor pulse, and he did not complain now of headache. His bowels, furthermore, were not constipated, his breath was not offensive, and his digestion was good. His pupillary reaction was normal; his eye-ground was examined at no time, as he could not sit up.

It was decided to explore the middle-ear cavities by way of the mastoid, in order to gain an idea of the pathway of infection to the brain.

This was done by Dr. Burnett in the usual way: the antrum, aditus, and attic were thrown into one cavity, but the mastoid cells, which were found to be normal, were not touched beyond removal of the cortex to reveal their condition. No pus was found in any of these spaces; only crumbling bone and two or three granulations, which were removed from the antrum. No communication through the tegmen tympani with the cranial cavity could be found. It was then decided to trephine the squama and explore the temporal region, as the otitic inflammation had apparently passed in that direction. Accordingly a one-inch crown trephine was placed by Dr. Wharton directly above the external auditory meatus, so that its lower edge was about an inch above this opening. Upon removal of the button of bone, the brain was felt to pulsate, and the dura was seen to be a little reddened near the anterior edge of the trephine opening. A bent grooved director was now passed by Dr. Wharton between the dura and the bone, toward the tegmen tympani, and about two fluidrachms of offensive pus were quickly liberated. Subsequent developments have shown us that it would have been well, in addition to this interference, to have explored the brain tissue of the temporal lobe at this time, after the manner of some of the Germans, to see if there might be a cerebral abscess simultaneous with the epidural collection of pus.

The wounds behind and above the ear were cleansed, drained, and stitched. The patient recovered from the ether very well and quickly, the operation having lasted over an hour. The temperature before the operation was 98.6° F. at 8 A.M., and after the operation (2 P.M.) it was 105° F.; but after that it fluctuated, though on the whole it showed a downward tendency for seven days, until from 100.2° F. it went up in twenty-four hours to 104.2° F. The sensory aphasia increased, though the patient's cerebration was a little better. The day the temperature reached 104.2° F. at 8 A.M., the temperature at 12 M. was 101.8° F., when the patient vomited. At 8 P.M. the same day he had a chill. On the next day, July 9th, the patient had another chill at noon, his temperature being 102.4° F. By July 10th the man's speech was quite incoherent and unintelligible, though his efforts to speak were voluntary. His cerebration was now very poor, but he complained of no pain anywhere. His general sensibility was perfect, as he would drive the flies from his face and hands. He was restless at night, especially in the right leg and arm, he slept poorly, and yet at times, even during the day, his breathing was almost stertorous.

It was now thought by Dr. Burnett that the middle fossa of the skull

might not be sufficiently drained, and, therefore, it was decided to make a communication between the site of the epidural abscess and the drum-cavity through the carious tegmen tympani, which was done by Drs. Wharton and Burnett by cutting away the bone between the lower edge of the trephine opening in the squama and the tegmen, in the line of the upper wall of the auditory canal. When the tegmen was reached it was cut through with slender bone-forceps. No pus, however, escaped, and there was but slight bleeding. After the second operation the temperature tended upward and the aphasia increased, becoming complete, the mentality grew very dull, and by July 12th the right arm and leg became entirely paretic. There was also conjugate deviation of the eyes toward the left—the diseased side. Pupillary reaction was normal throughout our observation of the case in both eyes.

By July 13th it became very evident that there must be a collection of pus in the brain substance, most probably in the left temporal lobe. It was, therefore, decided to make an exploratory puncture of that region, which was done by Dr. Wharton, without ether, by means of a grooved director passed directly inward about one and a half inches, after the lower edge of the squamal flap had been turned back and the dura nicked open with the point of a knife, just enough to admit the director. Immediately about one-half fluidounce of thick, greenish, offensive pus escaped. The wound was then cleansed and a rubber drainage-tube inserted into the pus-cavity in the brain. None of this manipulation was perceived by the comatose patient, excepting the removal of a stitch from the skin-flap. The patient, however, did not recover consciousness; the paresis of the right side continued, but the conjugate deviation of the eyes disappeared. Pus continued to come from the brain, through the drain. But the temperature began to go up; there were involuntary discharges of urine; stupor was succeeded by profound coma, and the patient died without convulsions, with a temperature of 106.4° F., on July 15th, at 1 p.m. No post-mortem examination could be obtained.

The oscillations in the patient's temperature at 8 A.M. and 8 P.M., from June 30th to July 15th, are herewith appended:

		8 A.M.	8 P.M.
June	30	98.6° F.	100.8° F.
July	1	101.8	101.8
"	2	103.2	102.2
"	3	103.2	102.0
"	4	101.4	100.0
"	5	99.6	99.0
"	6	102.4	101.2
"	7	100.2	101.2
"	8	104.2	101.6
"	9	102.0	104.4
"	10	97.6	104.2
"	11	102.2	101.2
"	12	100.8	99.8
"	13	98.4	102.6
"	14	101.2	104.0
"	15	105.0	106.4 at 1 p.m. (death).

At no time during our observation of this case was there any complaint of any form of suffering made by the patient. The only symptoms of pressure from abscess in the temporal region were the sensory aphasia at first, and then the paresis on the side opposite to the diseased ear. The fluctuating temperature, with the continued frequent pulse and respirations, would indicate a pyæmic condition rather than the presence of a brain-abscess. But there were no signs of phlebitis nor thrombosis of the sinuses and jugular, and we knew the necrosis of the tympanic cavity had not advanced in the direction of the sigmoid groove, but had progressed in the direction of the attic.

The patient continued to present symptoms of pressure within the brain, notwithstanding the pus liberated, until, with a very high temperature, death supervened upon profound coma.

It becomes plain now that the epidural collection of pus in the middle cranial fossa could not account for the aphasic symptoms in this case, and, although where pus is found outside the intact dura one hesitates to puncture it for exploration of deeper parts, we now know it would have been better, with the aphasic symptoms in mind, to puncture the dura and brain at the time of the first operation, for doubtless we should have found pus in the latter. In fact, this method has been pursued with entire success when epidural pus has been met in the presence of symptoms of abscess in the temporal lobe.¹ The pyæmic pulse, respiration, and fluctuating body-temperatures, all existing in this instance, would naturally lead one to infer thrombo-phlebitis of the sinuses on the left side. But there were no symptoms to indicate such a condition, excepting the temperature oscillations. It is, however, very unusual to find such temperature fluctuations associated simply with cerebral abscess.

THE RÖNTGEN RAYS IN OPHTHALMIC SURGERY.

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THE discovery of Röntgen, that the soft tissues of the body were transparent to certain rays emitted from a vacuum-tube when electrically stimulated, and its practical application to the uses of medicine and surgery, mark a distinct epoch in the history of science. Experiments conducted by scientists over the world immediately confirmed the announcement of the mystic properties of the Röntgen or x-rays, and during the eighteen months that have passed continued experimenta-

¹ Case by Dr. J. E. H. Nichols, Manhattan Eye and Ear Hospital Reports, January, 1897.

tion has increased their applicability, widened their field of usefulness, and defined in part their capabilities and limitations, and has given us every reason to believe that further research, with improved apparatus and with a more profound knowledge of their intimate nature, will lead to still greater achievements. We may hope, for example, by varying intensities of energy, or diminished duration of exposure, or modification of the vacuum-tubes, to inspect, with some degree of clearness, the contents of organs of which we now barely see the outlines, to differentiate diseased from normal structures, and to give to the x-rays the prominent place in medicine that they now occupy in surgery.

The attention of ophthalmologists was practically drawn to the utilization of the Röntgen process in ophthalmic surgery in the detection of foreign bodies, such as glass and fragments of metal, in the interior of the eyeball, by the papers of Clark and Williams,¹ which announced for the first time that the coats of the ball are penetrable by the rays, and that the presence of foreign bodies can be diagnosticated by their shadows cast on negatives and developed by the ordinary photographic processes. In Clark's case, the metal, the presence of which had hitherto been extremely uncertain, was discovered to be behind the iris near the corneo-scleral angle. It was extracted by the Hirschberg magnet, and the patient recovered almost the full acuity of vision. The method of operating the apparatus was original and novel. A photographic film encased in waterproof covering was inserted into the nostril of the same side as the injured eye until its upper extremity lay in contact with the cribriform plate of the ethmoid bone. The Crookes tube was stationed in front and to the same side of the head, about thirteen inches distant from the eye. The rays passed through the envelopes of the eye, the nasal bone, the nasal process of the superior maxillary bone, and the soft tissues, casting well-defined shadows of the bony parts and of the piece of metal. The diagnosis and cure were effected by the one force under widely different manifestations. Williams' result in determining the applicability of the rays to the diagnosis was equally satisfactory, but unfortunately the severe accident destroyed both the sight and the ball. The patient was laid on his side on a table with the temple resting upon the glass plate and the tube held obliquely thirteen inches above and in front of the face. The rays pierced the eye, its adjacent soft tissues, and the bones of the external wall of the orbit, the last casting its clearly outlined shadow together with that of the foreign body, both readily distinguishable from other shadows on the plate. The history of the injury showed that the offending substance was copper, therefore the use of the magnet was precluded. The eye was enucleated and the diagnosis proved. It is interesting to observe that the different

¹ Transactions of the American Ophthalmological Society, July, 1896.

methods of experimentation resorted to in these two cases demonstrate, respectively, that the nasal and temporal walls of the orbit offer no practical obstacle to the applicability of the Röntgen process in ophthalmic surgery, and that both the results disprove the statement that the ocular envelopes themselves cast shadows so dense that that of a fragment of metal would be concealed.¹

The good work inaugurated in Columbus and Boston has been continued in Philadelphia with uniformly successful result. The labors of Stern in the Polyclinic, of Goodspeed and Leonard in the University, and of Sweet in the private laboratory of Queen & Co. have met with pronounced success. To the first-named gentleman I am indebted for the excellent skiagraphs of the two cases reported below. After repeated experiments according to the suggestions of Clark and Williams, Dr. Stern succeeded—by the simple method of bandaging the sensitive plate to the temple on the side of the wounded eye, allowing the patient to sit upright, and suspending the tube in front of and to the opposite side at the angle of 45 degrees with the optic axis, and fourteen inches distant—in obtaining pictures that showed beyond question the existence of foreign bodies within the ball.

These are the first two successful cases in Philadelphia, and demonstrate the claim previously made, that the x-rays are a useful adjunct to the diagnostic resources of the ophthalmic surgeon.

During the past winter, with the kind co-operation of Dr. Stern, I made a number of efforts to determine whether the rays had a beneficent or injurious action upon diseased and healthy eyes. It was found, in cases of opacity of the media, such as leucomatous corneæ, capsular and lenticular cataract, that no improvement whatever could be noted either in the disease or in the ability of the patients to see clearer through the fluoroscope than without it. In a case of nearly absolute central scotoma due to a large patch of central retino-choroiditis, repeated exposure to the rays as they were emitted from the tube gave the same negative result. The findings in cases of atrophy of the optic nerve were equally discouraging. From these trials it was concluded that, as a means of treatment of diseases causing blindness, the rays were of no value. The only exception to this statement is recorded in the history of Case I., when the exposure had the unexpected effect of soothing pain and reducing inflammation; but whether this happy result was simply a coincidence or a real or psychic manifestation, cannot be asserted. Dr. Wilkinson, of the California School for the Blind, selected six pupils for testing, one with destruction of the anterior part of each eye from old traumatism, one with complicated congenital cataract, one with partial phthisis bulbi from ophthalmia neonatorum, and three with optic-

¹ AMERICAN JOURNAL OF THE MEDICAL SCIENCES, March, 1896.

nerve atrophy. In none did the rays assist the vision in the slightest degree. Beck,¹ in speaking of the possible curative effects of the rays in zymotic diseases, states that the vitality of pathogenic bacteria is not impaired even after exposure of several hours. As bearing upon the subject of the sedative action of the rays, mentioned as occurring in my first case, the report of their effect² on frogs is of interest. A frog was placed in a small wooden box toward which the rays were directed, while a control frog in a similar box was protected from the rays by a sheet of lead laid on top of the box. To each was administered 0.04 mgm. of strychnine; the first showed no trace of intoxication, while the second was found in tetanic convulsions. Beck's suggestion,³ that persons blind from loss of transparency of the media might be able to read letters painted on a cardboard that were varnished and dusted with powdered metal, if they were subjected to the action of the x-rays, is impracticable unless a fluoroscope or some other impossible tungstate of calcium screen, by which shadows were rendered visible, be placed behind the opaque cornea or lens. Otherwise this source of illumination is no more available than any other.

No cases of injury to the tissues of the eye from the action of the rays, even under the former prolonged exposures, have been published, and now with improved apparatus the danger of burning the skin or producing destruction of the hair-bulbs is insignificant.

CASE I.—R. G., machinist, twenty-five years of age, applied at the Out-Patient Department of the Jefferson Hospital in October, 1895, with the history of an injury to the left eye while breaking a cast-iron elbow with a hammer. The cornea presented a small, irregular cicatrix; the anterior capsule and the lens had commenced to become opaque; the iris was inflamed and adherent to the capsule, and vision was greatly reduced. No foreign substance could be seen in the imperfectly illuminated media or fundus. Under treatment the inflammation subsided, and no operation was resorted to. The man was requested to return frequently for inspection. No severe symptoms developed, although the eye was subject to attacks of irritation, until October, 1896, one year later, when iridocyclitis supervened. The patient was now subjected to the x-rays, and, after most creditable perseverance, Dr. Stern succeeded in obtaining a shadow picture that showed the presence of a piece of metal probably located in the anterior portion of the vitreous body. One of the exposures was made during an attack of iridocyclitis. The patient voluntarily stated that the pain, which had been severe, and had caused him sleepless nights, was promptly and entirely relieved, and it was observed that the marked injection was greatly reduced. After an unsuccessful attempt at extraction with the Hirschberg magnet the ball was enucleated. Upon section, a scale of iron, 2 mm. in length,

¹ Transactions of the Pan-American Congress, Mexico, 1896.

² St. Petersburg med. Wochenschr., No. 1, 1897.

³ The Memorabilien, February, 1897.

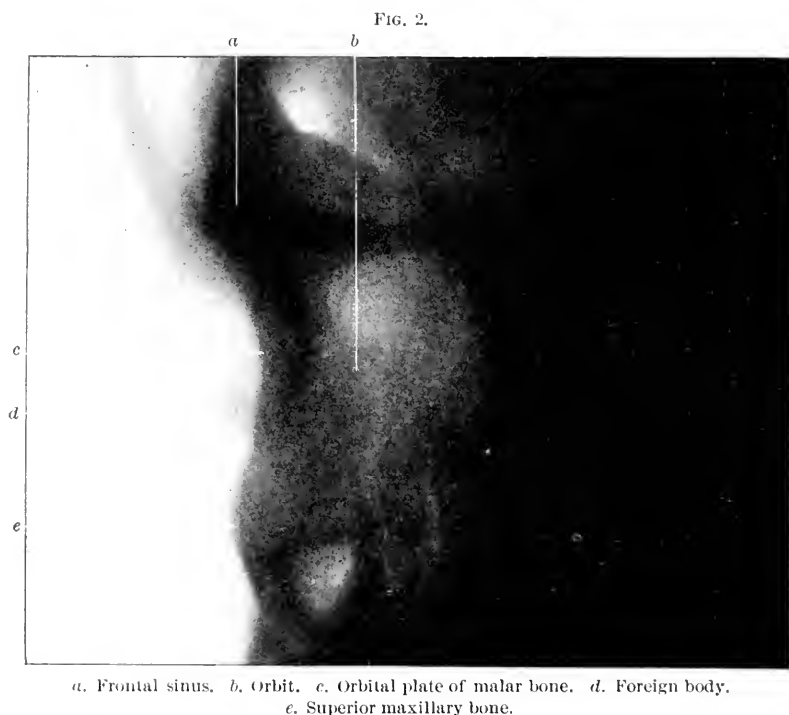
$\frac{1}{2}$ mm. in width, was found firmly embedded in the ciliary body and surrounded by a mass of exudation. (Fig. 1.)



CASE II.—F. N. was admitted into the wards of the Jefferson Hospital November 14, 1896. While chiselling a cast-iron staircase he received a wound in the left eye. The skin and cartilages of both lids, particularly the lower, were the seat of ragged wounds, the conjunctiva was cut, the cornea opened in its oblique diameter, the lens was missing, the iris protruded in part through the wound in the cornea, part of the vitreous was lost, and the anterior chamber contained blood. The edges of the wound in the lids were united by suture, the torn iris and protruding vitreous cut away, and the eye antiseptically dressed and bandaged. The patient asserted positively that the iron inflicting the injury was too large to be lodged within the ball, and from the extent of the superficial wounds I was inclined to concur in this opinion. After a week's vain effort to save the ball the x-rays were applied and the eye enucleated. No sections were made until after Dr. Stern's skiagraph showed positively the presence of a large piece of metal in the vitreous. Subsequently a fragment of cast iron, weighing 3 grains, of irregular shape, and with very sharp jagged edges, was found in the anterior part of the vitreous. (Fig. 2.)

Thus in two instances, in October and November respectively, skiagraphy demonstrated beyond question the presence and approximate

location of pieces of metal within the eyeball. In the one the condition had been assumed, in the other the earlier diagnosis had been proved incorrect. The next two cases reported in Philadelphia, by Ring and de Schweinitz, before the Ophthalmic Section of the College of Physicians, and published in its *Transactions*, January 19 and February 16, 1897, may be briefly referred to. In Ring's case a piece of steel had penetrated the vitreous eighteen months before. Two radiographs were



exhibited, each showing the presence and probable site of the foreign body. The Hirschberg magnet was powerless to dislodge it from its bed in the ciliary body, and the ball was enucleated. In the other case de Schweinitz succeeded in establishing the diagnosis by the rays, in extracting the metal after two futile attempts by other surgeons, and in restoring useful vision. The following case, the last of the series in Philadelphia to be published, was reported before the same section in February, 1897, by Dr. A. G. Thomson :

A small piece of steel had lodged in the posterior cortex of the lens of a young man. Because of the continued transparency of the lens some doubt was felt as to the nature of the foreign body. A series of skiagraphs, taken by Dr. William M. Sweet, demonstrated beyond question that the foreign substance was impenetrable to the rays. Dr.

William Thomson subsequently extracted the lens and with it the supposed metal.

Following Dr. Thomson in his detailed description of the treatment of the case, read before the American Ophthalmological Society, May, 1897, Sweet demonstrated his method of localizing foreign bodies in the eye, which has proved, both in this case and in others not yet published, accurate and of great value. Dr. C. A. Oliver reported at the same meeting the results of his own and Dr. Leonard's methods of localization based on practically the same principle as that described by Sweet.

It is evident, therefore, that the Röntgen process, even at this comparatively early stage of experimentation, when our knowledge of the rays is imperfect and immature, is an extremely valuable means of diagnosis in the surgery of the eye, and it is believed that continued investigation will not only confirm the claim and statements made in this paper, but will add to our conviction that in the x-rays we have an accurate, speedy, and reliable method of establishing the presence or absence of foreign bodies in the eyeball.

SEGMENTATION AND FRAGMENTATION OF THE MYOCARDIUM.¹

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THE muscular fibres of the mammalian heart were shown by Eberth² to be columns of short striated and nucleated cells or segments held together at the ends by a delicate cement. The cells have lateral processes that coalesce, by means of cement, with those of adjacent cells. Normally the layers of cement between the ends of the cells and their processes are not visible; on the addition of acetic acid the cement substance becomes quite plain, and with 30 per cent. solution of caustic potash the individual muscle-cells may be isolated (segments of Weissmann).

Of the morbid changes of the myocardium proper none occur more frequently or under a greater variety of circumstances than the lesion known as segmentation³ and fragmentation of the muscle-fibres.

¹ Read before the Philadelphia Pathological Society, April 22, 1897.

² Die Elemente der Guergestreiften Muskeln, Virchow's Archiv, 1866, Bd. xxviii. p. 100.

³ In biology segmentation means cell-cleavage; generally it means the act of dividing into the segments or parts into which any body naturally separates. It is in the latter sense that the word is used in connection with the lesions of the myocardium under discussion, and it means the separation of the muscle-fibres of the heart into the cells or segments of which they

While Virchow,¹ v. Zenker,² Rindfleisch,³ and Coats⁴ make incidental mention of transverse separation or fracture of the cardiac muscle-fibres, Renault,⁵ in association with Landouzy, in 1877, was the first to call direct attention to the dissociation of the muscle-cells. They showed that, as they believed, under the influence of general nutritive disturbances the intercellular cement softened and the individual cells were set free. They referred to this condition as "disintegration, dissociation, segmentation—*état segmentaire*." This observation was followed by a number of clinical and anatomical studies of the subject by pupils of Renault as well as by other French writers—Colrat,⁶ Durand,⁷ Chalot,⁸ Weill,⁹ Dejerine,¹⁰ Duplaix,¹¹ Mollard.¹² Mention of the change was also soon made by various French systematic writers—Pitres,¹³ Lancereaux,¹⁴ Jaccard,¹⁵ Paul,¹⁶ Robin,¹⁷—and in 1890 Renault¹⁸ published an article in which he not only describes the anatomical changes, but also gives the clinical picture of the condition, which he dignifies as an independent disease. The principal symptoms are: Arrhythmia, weakening of the impulse of the apex, some increase in the area of the heart's dullness, an uncertain systolic murmur, and, occasionally, oedema of the lower extremities. He attributes the dissociation of the cells to solution of the cement substance on account of senile involutionary changes, alcoholism, infection, and the associated high temperature. Individuals affected with such changes in the heart-muscle may perish on account of syncope or asystole, or from intercurrent diseases which, otherwise of little importance, assume a much more serious aspect on account of the existing heart-lesion.

are composed. "Fragmentation" signifies a breaking into irregular pieces. Both terms are applied to dissociation of the cardiac muscle fibres. In this paper they will be employed as consistently as possible.

¹ Ueber parenchymatöse Entzündung, Virch. Arch., Bd. iv, p. 266.

² Ueber die Veränderungen der willkürlichen Muskeln in Typhus Abdominalis, 1864.

³ Lehrbuch der pathologischen Gewebelehre, 1870, p. 202; 11th ed., p. 239.

⁴ Two Cases of Calcareous Infiltration of the Muscular Fibres of the Heart, Glasgow Medical Journal, 1872.

⁵ Note sur les alterations du myocarde accompagnant l'inertie cardiaque, Société de Biologie, July 7, 1877.

⁶ Contribution à l'étude des myocardites chroniques et la désintégration cardiaque, Lyon Méd., 1879.

⁷ Etude anatomique sur la segment cellulaire cardiaque, Thèse de Lyon, 1879.

⁸ Essai sur la désintégration de la fibre musculaire, Thèse de Paris, 1880.

⁹ De la mort subite dans la pleurésie, Revue de Médecine, 1887, No. 1.

¹⁰ Sur les alterations du myocarde come cause de mort subite dans le fièvre typhoïde, Soc. de Biol., Dec. 26, 1885.

¹¹ Contribution à l'étude de la sclérose, Arch. Gén. de Médecine, 1885, 7 série, p. 145.

¹² De la myocardite sigmentaire essentielle et principalement de la forme senile de cette affection, Thèse de Lyon, 1889.

¹³ Des hypertrophies et des dilatations cardiaques indépendantes des lésions valvulaires, 1878.

¹⁴ Traité d'anat. path., 1881, p. 799.

¹⁵ Traité de path. interne, 1883.

¹⁶ Maladies du cœur, 1883, p. 468.

¹⁷ Leçons de clinique et thérapeutique médicale, 1877, 20ième leçon.

¹⁸ Gazette des Hôpitaux, 1890, p. 202.

In 1888 Przewoski and Klein¹ described some cases of very sudden death which were attributed to extensive myocardial segmentation. The following year Browicz² published a study of segmentation based on the careful examination of forty-two cases. This is the first publication on the subject in the German language. He concludes that segmentation is due to changes in the cement substance, occurs ante mortem, and may cause cardiac insufficiency and arrest of the heart's action.

In the discussion upon the disturbances of the myocardium at the Tenth International Medical Congress in Berlin, in 1890, v. Reeklinghausen³ states that microscopic appearances and the frequent connection of dissociation with sudden or rapid, spontaneous death lead him to regard this change in the cardiac fibres as the result of excessive stimulation and irregular contraction of their substance, which passes directly into rigor mortis, and is accompanied with a separation into segments as well as a breaking into fragments. There is, therefore, no ground for believing, as Renaut does, that the primary change is in the cement substance. The frequent association of these changes with the various pathological conditions included under the term myocarditis shows that these conditions, on account of changes in the muscular tissue or in the heart's activity, predispose the fibres to dissociation.

v. Zenker⁴ agrees as to the agonal character of actual dissociation. It would be impossible for cardiac contractions to continue after a general disintegration in this manner of the muscle-fibres; but it is equally evident that a heart whose fibres undergo agonal dissociation must have been the seat of intravital, physical, and chemical changes that gave rise to the weakness and final arrest. The *état segmentaire* is, therefore, an anatomical change that explains to a certain extent many deaths from "heart-failure" (*Herzschlag*).

Marchand⁵ (Marburg) in the same discussion questions the statement that the fragments always correspond to the heart muscle-cells, and suggests that possibly the lines of separation represent, as assumed by Wagner, irregular lines of contraction along which separation later on occurs.

Tedeschi⁶ found that in two hundred and thirty-six deaths from various causes segmentation was present in 48 per cent. The frequency of dissociation in infectious diseases and in acute and chronic diseases of the central nervous system lead this author to believe that physical changes in the cement, due to toxic substances or to nutritive disturbances, are the essential causes of the process.

¹ Gazeta lekarska, 1888, No. 18.

² Ueber das Verhalten der Muskelzellbalken des Herzens in path. Zuständen, Wiener kl. Wochenschrift, 1890, No. 80.

³ Verhandlungen des X Intern. med. Congress, Berlin, 1890, Bd. ii. Abth. 3.

⁴ Loc. cit.

⁵ Loc. cit.

⁶ Ueber die Fragmentatio des Myocardium, Virch. Arch., 1892, Bd. cxxviii. p. 185.

Israel¹ made the important observation that in districts of separation there is a marked loosening in the secondary bundles, due apparently to stretching of the intermuscular connective tissue—a change that would point to the action of mechanical influences. Not being able to produce any changes by means of mechanical overdilatation or stretching of dead hearts, he assumes the constant presence of some deviation from the normal in the primitive bundles of disunited hearts, such as pigment atrophy, parenchymatous changes, and fatty degeneration. Under such conditions he is inclined to conclude that any increase in the work placed upon the heart may lead to separation.

Oestreich,² in 1894, reviewed dissociation or fragmentation with reference to the anatomical changes, to its relation to the cement, and to its importance as regards the heart's work. He came to the conclusion that it concerns not so much separation of the muscle-fibres into muscle-cells by a solution of the cement, as spoken of by the previous authors, but that fragmentation is essentially, as this term would imply, multiple fractures or tears of muscle-fibres, the lines of which oftener pass through the muscle-cells than along the cement substance. Longitudinal ruptures were also occasionally seen. Such being the case, and fragmentation occurring very often in otherwise normal hearts in persons dying suddenly, rapidly, or slowly from known causes, he concludes that it is caused by irregular contractions during the death agony, and may occur in connection with practically all diseases and modes of death.

L. Bard³ regards the *état segmentaire* of Renaut as fragmentation or rupture of the fibres rather than a segmentary dissociation. These ruptures are probably of post-mortem origin, due to reagents and diverse manipulations; yet they are not artefacts, because the real condition is an excessive fragility on account of secondary nutritive troubles. It is, therefore, a subordinate lesion, found in grave acute diseases and in asystolic hearts, that cannot be promoted to the rank of a special primary process.

Renaut,⁴ at the first French Congress of Medicine, in 1894, again reviews the subject of segmentary dissociation of the myocardium, and essays to prove, in contradiction to v. Recklinghausen,⁵ Oestreich,⁶ and others, that it concerns an undoubtedly vital and not merely agonal lesion; that segmentation and fragmentation are part and parcel of a complex and progressive, definite, morbid process, the seat of which is in the muscle-cells. This process is characterized anatomically by great swelling or gigantism of the nuclei of the muscle-cells, by a marked increase

¹ Zur Entstehung der Fragmentatio Myocardii, Virch. Arch., 1893, Bd. cxxxiii. p. 551.

² Die Fragmentatio Myocardii, Virch. Arch., 1894, Bd. cxxxv. p. 79.

³ De la signification anatomique et clinique des diverses lésions du myocarde, Congrès Français de Médecine (1894), Paris, 1895, p. 806.

⁴ Sur la dissociation segmentaire du myocarde, Congrès Français, etc., 1895.

⁵ Loc. cit.

⁶ Loc. cit.

of the intercontractile plasma of the cells, which causes an atrophy of the fibrillæ—"hyperplasmic atrophy"—making the fibres perhaps brittle, and thus predisposing to fragmentation; and, finally, by softening and liquefaction of the intercellular cement, which allows segmentation to take place. This dystrophy, of whatever cause it may be, leads sooner or later to cardiac asthenia, and Renaut claims that senile cardiac insufficiency due to this pathological process is susceptible of clinical diagnosis.

American medical literature is silent upon the subject of myocardial dissociation. The scattered remarks on the subject in the *Twentieth Century Practice* contain historically erroneous statements that deprive Renaut of his due credit as the one to whom we owe our knowledge of the lesion.

The essential basis for the present consideration of this form or forms of disturbance in the myocardium rests partly upon a study of the literature bearing on the subject, but essentially upon the results obtained from investigation of a large number of hearts from animals and human beings dying from a variety of causes and under diverse circumstances.

ARTIFICIAL SEGMENTATION. The authors are now practically agreed that segmentary dissociation is not of post-mortem origin, neither is it an artefact. v. Recklinghausen,¹ Renaut,² and others have found well-marked segmentation in hearts from bodies—especially of executed individuals—that were examined immediately after death. I have found it present in bodies examined within one hour after death.

Histologists are well aware, especially since Eberth's³ work, that certain reagents, such as solutions of acetic acid, have to be applied to render the cement substance visible; and, furthermore, that 30 or 40 per cent. solutions of KOH dissolve the cement and set the muscle-cells free.

Tedeschi⁴ found that the fixing and staining fluids ordinarily in use do not produce misleading artefacts. Flemming's solution only seemed to render the cement substance visible, and should consequently not be used in studying the heart-muscle in regard to the presence of segmentation.

While segmentation was looked upon as a cadaveric change by O. Israel,⁵ in 1889, he freely denies all influence of artificial and post-mortem factors in its production in 1893.⁶

Rindfleisch claims to have produced mechanical disintegration by overdilatation of a dead rabbit's heart, but neither Israel⁷ nor Browicz⁸ could produce segmentation by mechanical overdilatation and stretching

¹ Loc. cit.

² Loc. cit.

³ Loc. cit.

⁴ Loc. cit.

⁵ *Praktikum der path. Histologie*, 1889, p. 255.

⁶ Loc. cit.

⁷ Loc. cit.

⁸ Ueber d. Bedeutung d. Veränderungen der Kittsubstanz der Muskelzellbalken des Herzens, *Virch. Arch.*, Bd. cxxiv, p. 1.

of dead hearts. Israel¹ found that forcible overdilatation of tetanized hearts did not produce dissociation.

While decomposition under ordinary circumstances (Browicz,² Tedeschi³) does not cause dissociation, Dunin⁴ found that artificial gastric juice as well as decomposition under water may cause separation of the cells. He, therefore, regards chemical changes in the organism as the essential cause of dissociation, while mechanical conditions might produce ruptures of the muscle-cells themselves. He expresses the opinion that possibly the agonal invasion of the bacterium *coli commune* may cause chemical solution of the cement substance.

A number of human hearts were allowed to decompose in a moist atmosphere, at room temperature as well as in the ice-box; but it so happened that none of them, examined at irregular intervals up to ten days after removal from the body, showed any separation of the fibres. Pieces from healthy human hearts were also allowed to decompose under water as well as to remain for from twenty-four to forty-eight hours in bouillon cultures of colon bacilli; but the fibres did not become disunited, not even in the vicinity of the bacterial colonies in the interior of the pieces. Similar results were obtained with animal hearts. In this respect my observations differ from those reported by Dunin.

Animal as well as human hearts were examined before and after rigor mortis, but no difference in the structure of the muscle-fibre was observed. Hearts were allowed to freeze stiff, but segmentation did not occur. The view expressed by Rosenbach,⁵ that the fall of the temperature of the body after death leads to dissociation, did not receive support.

It may, therefore, be concluded that true segmentation, as ordinarily observed, is not an artefact or post-mortem change. In reality there is all reason to believe that no artificial separation of the cells can, under any circumstances, present such microscopic pictures as the sections of hardened specimens of hearts the seat of typical dissociation (Fig. 5). On the other hand, it cannot be denied that various reagents and manipulations may produce ruptures of the muscle-fibres, especially if the latter are brittle on account of degenerative changes. Thus, pressure on the cover-glass may be sufficient to produce breaks in underlying fibres in teased and unimbedded specimens.

EXPERIMENTAL SEGMENTATION AND SEGMENTATION IN ANIMALS. Tedeschi⁶ instituted an extensive series of experiments; but infections, injuries to the brain, traumatic sudden death, overstimulation, etc., failed to produce dissociation in mice, guinea-pigs, rabbits, cats, and dogs. Cutting of the vagus produced indications of segmentation in

¹ Loc. cit.

² Loc. cit.

³ Loc. cit.

⁴ Einige Bemerkungen über der Fragmentation der Herzmuskelzellen, Ziegler's Beiträge, 1894, Bd. xvi.

⁵ Die Krankheiten des Herzens und ihre Behandlung, p. 666.

⁶ Loc. cit.

circumscribed districts. Some segmentation also occurred around wounds made with red-hot needles.

Oestreich,¹ having observed segmentation in persons that died from or in chloroform narcosis, tried in vain to produce this change by killing animals (four dogs and one rabbit) by administration of chloroform.

Charrin² showed that among the extensive changes in the myocardium following the injection of the sterile products of the bacillus pyocyaneus are necrotic areas, in the centre of which there may be segmentation of the fibres.

J. Mollard and Cl. Regnaud³ found that in dogs that die from diphtheria intoxication sinuous lines corresponding to the points of contact of the muscle-cells at times become visible, and that occasional segmentation may take place. Fractures of the fibres were also present.

I have examined a large number of hearts from dogs, cats, chickens, rabbits, guinea-pigs, mice, and rats that died from various infections or were killed in the course of ordinary laboratory experiments (here is included a number of animals that died from experimental air embolism). The results were practically negative as regards segmentation. Only in one guinea-pig that died from diphtheria intoxication did the heart present distinctly visible transverse cement lines.

The fresh hearts were obtained from six hogs, six sheep, and six young cattle butchered at the stock-yards. Segmentation was not present in a single heart; not even were the cement lines visible. All the hearts were firm and healthy.

A thorough histological study was also made of the different portions of ten horse hearts. The hearts were obtained from old and useless horses that were killed for the products obtainable from their bodies. In almost all these hearts the cement substance was quite distinct, in the form of transverse, quite straight, more or less prominent lines; but typical segmentation was not observed in a single instance. The pigment was very plain in some of these specimens.

Through the courtesy of Dr. A. H. Baker, of the Chicago Veterinary College, I obtained the heart of a horse that died of enteritis and the heart of one dying from influenza, pneumonia, and exudative pleurisy. Both these hearts were the seat of well-marked parenchymatous degeneration, the consistence being rather soft and the cut surface presenting a yellowish-gray, opaque appearance, and the sections showed some separation of the muscular fibres in the right as well as in the left ventricle, but this separation seemed to be due more to a rupture of the fibres than to solution of the cement, because the margins of the fragments were very ragged.

¹ Loc. cit.

² Verh. d. X. Intern. Med. Congresses, 1890, Bd. ii. Abth. 2.

³ Lésions du myocarde dans l'intoxication aigue par la toxine diphthérique, Annales d. l'institut Pasteur, 1897, t. ii. p. 97.

It is consequently probable that in the hearts of diseased larger animals segmentation and fragmentation also occur, although perhaps not to such an extent as these changes are observed in man. It would seem that, on the whole, human heart-muscle is especially prone to dissociation as compared with the heart-muscle of animals.

SEGMENTATION AND FRAGMENTATION IN MAN. The hearts from more than two hundred persons dying from all sorts of causes have been studied as regards segmentation and allied changes. Many of these hearts were obtained through the courtesy of Dr. Louis J. Mitchell, physician to the Coroner's office of Cook County, and I wish to thank Dr. Mitchell for his great kindness in this matter, especially because he made it possible for me to examine the hearts from those dying suddenly from both natural as well as traumatic causes. I also wish to thank Prof. J. B. Herrick and Dr. Noel for aid in obtaining suitable hearts. The large majority of the specimens came from the dead-house of the Cook County Hospital.

As far as possible accurate observations were made in regard to the time of examination after death, to the degree of contraction and of fulness of the different cavities of the heart, and especially as to the looseness or firmness of texture of the heart's flesh, in order to obtain, if possible, any data that would warrant the formation of an opinion as to the presence of segmentation from the mere naked-eye inspection. In the majority of the cases teased preparations from the left papillary muscles and from the ventricular septum were made in physiological salt solution and mounted in glycerine. Taking the statements of Tedeschi and Oestreich for granted, namely, that if fragmentation is present at all in a heart, it will be found first in the left papillary muscles and then in the septum, it was concluded that if the teased specimens failed to demonstrate segmentation, then no further examination of such hearts would be made except to harden, embed, and make stained sections from the two places mentioned, in order to control the correctness of the conclusion based on the examination of the teased preparations. It was found that practically, without any exception, the study of carefully and gently made teased specimens will demonstrate satisfactorily the presence or absence of general segmentation. Small pieces in which the fibres run parallel with each other should be used and carefully dissociated by means of fine, clean needles. Teased specimens are hardly sufficient, however, to demonstrate the absence or presence of focal segmentation, because the routine histological examination of a number of specimens in which teasing had not revealed any changes showed frequent foci of segmentation. Whenever the teased specimens showed fragmentation, suitable pieces were cut out from the different parts of the hearts and hardened in 5 per cent. solution of formalin, in alcohol, or in Müller's fluid, embedded in celloidin or paraffin, and stained

(after fixation on the slide in the case of paraffin specimens), mostly with hæmatoxylin and eosin. A few fatty degenerated hearts were fixed in Flemming's solution and stained with safranin. I can confirm Tedeschi's statement that none of the ordinary histological methods give rise to misleading artefacts. Like Tedeschi, I also observed that the intercellular cement becomes markedly prominent in preparations fixed in Flemming's solution; but inasmuch as it concerned mostly fatty hearts, usually with some real dissociation, I cannot say how much of the apparent change was real and how much artificial.

In the table showing the percentages I have included under the heading "Segmentation and Fragmentation," in addition to the typical cases, all the instances in which the intercellular substance was plainly visible in the teased specimens, because this change is undoubtedly closely related to actual segmentation, and also all cases of more or less well-marked fragmentation in which it seemed reasonable to believe that the change was not wholly an artefact.

TABLE SHOWING THE RELATIONS OF MYOCARDIAL DISUNION TO SEX AND AGE IN 190 CASES.

Decimal periods.	Normal.		Segmentation and fragmentation.		Percentage of disunion.	
	Female.	Male.	Female.	Male.	Female.	Male.
I.	5	9	1	0	16.66	0
II.	2	4	0	4	0	50
III.	4	9	8	22	66.66	70.96
IV.	3	14	9	19	75	57.57
V.	1	5	7	25	87.50	83.33
VI.	3	1	1	17	25	94.44
VII.	2	3	3	9	60	75
Total	20	45	29	96	59.18	68.08
Total number of cases					190	
Disunion in					65.78 per ct.	

THE FREQUENCY OF SEGMENTATION AND ITS RELATION TO OTHER DISEASES. (*a*) *General Frequency.* v. Recklinghausen¹ found segmentation present in all cases of spontaneous sudden death occurring in the course of chronic myocarditis, coronary sclerosis, or changes at the root of the aorta; in many acute infectious diseases; in cases of sudden death in nephritis with cardiac hypertrophy, but without cerebral hemor-

¹ Loc. cit.

rlage; in rapid death from cerebral hemorrhage; and, finally, in many cases of sudden death due to traumatism and other causes. He did not find it in influenza or acute articular rheumatism.

Todeschi¹ gives the following statistics: In two hundred and thirty-six cases of death from various diseases he observed segmentation or fragmentation in 48 per cent. (in the men 44 per cent., in the women 53 per cent.); twenty-three cases, from one to ten years old, gave 9 per cent.; twenty cases, from eleven to twenty, gave 50 per cent. (43 per cent. in the male and 66 per cent. in the female); fifty-seven cases, from twenty-one to thirty, gave 48 per cent. (43 per cent. in the male and 53 per cent. in the female); forty-eight cases, from thirty-one to forty, gave 54 per cent. (61 per cent. in the male and 45 per cent. in the female); thirty-one cases, from forty-one to fifty, gave 62 per cent. (44 per cent. in the male and 86 per cent. in the female); thirty-one cases, from fifty-one to sixty, gave 40 per cent. (equal in both sexes); fourteen cases, from sixty-one to seventy, gave 80 per cent. for men and 100 per cent. for women; after seventy-six years, 50 per cent. for men and 33 per cent. for both sexes. As regards diseases, severe general infections in adults were accompanied with this lesion in 82 per cent.; deaths after severe operations in 100 per cent. (ten cases); cerebral diseases in adults in 92 per cent.; heart-diseases in 50 per cent. of the cases.

Oestreich,² without presenting any figures, says that, after extended observations, it would be practically impossible to name a disease in connection with which he had not observed fragmentation—it may occur in every disease.

In one hundred and ninety consecutive cases that I have examined segmentation and fragmentation in the broadest sense occurred in 65.78 per cent. Except in the first, and, to a less extent, in the second, decennium, this lesion is certainly present in the majority of the cases that die from the ordinary causes under familiar circumstances. In about one-half of the cases it concerned a marked general dissociation.

In the first decennium the only instance in fourteen cases occurred in an eighteen-months-old girl that died from acute nephritis and bronchopneumonia. The cement substance was clearly visible, and there were a number of ruptured fibres. The other cases examined include a wide range of pathological conditions.

In the second decennium there were four instances of focal or slight segmentation in ten cases. Two were quick deaths from traumatic causes (crushing injury and bullet-wound of chest), one died from gas-asphyxia, one after a bullet-wound of the spleen, and all were free from any important chronic diseases.

(b) *Relation of Segmentation to Infections.* A general bacteriological

examination was made in forty-nine cases. In fifteen the organs and the heart's blood were sterile; in thirty-four the commoner forms of bacteria (the colon bacterium, the pyogenic cocci, the micrococcus lanceolatus, the typhoid bacillus) were found more or less widely distributed. Segmentation and fragmentation were present in twenty of these cases and absent in fourteen. Without entering into details it may be said that any inseparable relation between any single micro-organism and segmentation in general, or at any particular period of life, could not be demonstrated from this small number. Thus, the colon bacillus was present in eight instances, four of which were cases of peritonitis; in three of the eight segmentation was present; the youngest of the five in which it was absent died at fifteen, the oldest at forty-five, both of peritonitis. In ten cases it concerned fatal infection with the micrococcus lanceolatus in the form of an anatomically typical lobar pneumonia frequently associated with endocarditis, pericarditis, and meningitis. In all these cases, the ages of which varied from twenty-three to sixty years, the heart was hypertrophied, weighing from 380 to 730 grammes, arterio-sclerosis being present in some of the hearts. Segmentation was present in nine. In eight cases of typical fibrinous pneumonia, but without bacteriological examination, disunion was observed five times.

In eleven cases in which the blood and the organs were sterile, dissociation was observed in five, including sarcomatosis, puerperal eclampsia, constitutional syphilis with interstitial nephritis, and glioma of the brain.

In two cases in particular there were found enormous numbers of rather long bacilli in the generally segmented heart-muscle, scattered between the sides and ends of the segments (Fig. 7). One was killed directly by a wagon passing over the abdomen, the other died instantaneously from the rupture of an aortic aneurism. This was, therefore, undoubtedly a post mortem bacillary invasion; and the possibility that the bacilli may have dissolved the cement substance cannot be wholly denied, although it must be remembered that segmentation is observed in cases of sudden traumatic death examined at once. It is evident, however, that the vital, agonal, or post-mortem action of bacteria upon the heart-muscle cannot account for the occurrence of segmentation and fragmentation in general.

(c) *The Relation of Segmentation to Diseases of the Heart.* While the number of cases from which deductions concerning the above question can be made is rather insufficient to warrant any extended analysis, yet the frequency with which segmentation occurs in connection with hypertrophy of the heart, due to the usual causes and often independent of the fatal disease, must be emphasized. Thus, in forty-three adult male cases the hearts of which weighed from 320 to 850 grammes,

segmentation was present in 90 per cent.; in sixteen adult female cases in which the hearts weighed from 270 to 900 grammes, segmentation was found in 68.75 per cent.; or in fifty-nine cases of men and women with hypertrophy of the heart, fragmentation was present in 74.57 per cent. More or less extensive chronic fibrous changes, in the broad sense, were present in most of these hearts. In twenty-one adult cases of atrophy of the heart (in women less than 240 grammes, in the men less than 290 grammes) segmentation, often in slight degree, or merely in the form of visible cement line, was present in 57 per cent. In all these cases it concerns hearts that were actually weighed.

(d) *Relation of Segmentation to Sudden Traumatic Death.* In the list are ten cases of death due to traumatism, such as gunshot-wounds and crushing railroad injuries. In the majority death was practically instantaneous. In all some degree of segmentation was present. Two cases occurred in individuals less than twenty years old.

THE NAKED-EYE APPEARANCES OF HEARTS THE SEAT OF DISSOCIATION. In "typhoid" and "asthenic" conditions—in which dissociation is so often present—the heart is usually more or less dilated and flaccid, its muscle reddish, brownish, or grayish-yellow, opaque, and friable or loose in its texture. These appearances, however, depend largely upon accompanying parenchymatous degenerations (*myodegeneration cordis*). Segmentary dissociation may be present without marked changes in color and consistence. Focal segmentation in particular may be present in the firmly contracted hearts, and von Recklinghausen,¹ Langerhans,² and Oestreich³ describe general segmentation in hearts that were not dilated. Renaut⁴ urges the general diastole of dissociated hearts as evidence against segmentation being caused by irregular or violent agonal contractions or ultimate tetanization, as claimed by some, which should leave the heart—in persons examined immediately post mortem—in systole. Segmentation is frequently found in hypertrophic hearts that appear quite firm and contracted. Consequently, changes in color and in consistence, as determined by contraction or dilatation, are not necessarily indicative of dissociation. According to Kaufmann,⁵ advanced segmentation may produce wavy swellings on the endocardial surface, especially on the papillary muscles. Oestreich⁶ regards increased friability and looseness in texture as very important evidence of dissociation. If, on stroking the cut surface, especially where the fibres run parallel, gently with the knife, clefts and fissures appear numerous in the myocardium, segmentation is quite surely present, even though the heart as a whole may have been quite firm and contracted. This corre-

¹ Loc. cit.

² Demonstration eines Falles von Carbolvergiftung, Berl. kl. Wochenschr., 1893, 37.

³ Loc. cit.

⁴ Loc. cit.

⁵ Lehrbuch der sp. Path. Anat., 1896, p. 24.

⁶ Loc. cit.

sponds with my experience. Focal and slight separation, however, require microscopic examination for their demonstration; and in any event it would not be wholly reliable to base a positive diagnosis of general segmentation on the naked-eye appearances only.

THE HISTOLOGY OF SEGMENTATION AND FRAGMENTATION. Segmentation may present itself in varying degrees. In many hearts distinct, finer or broader, apparently swollen lines, often staining quite

FIG. 1.

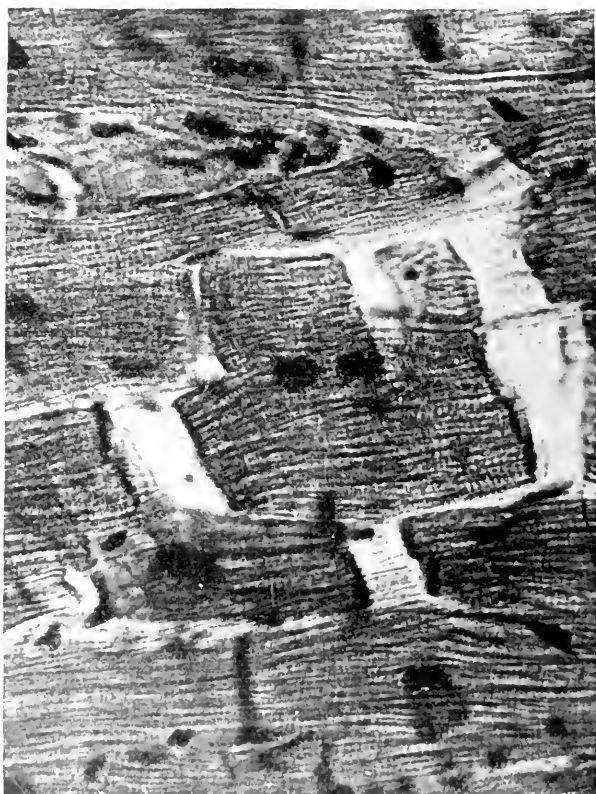


Cement lines visible. Man, aged sixty, carcinoma of stomach. $\times 125$.

deeply with eosin, run transversely across the fibres at irregular intervals (Figs. 1 and 5). The lines may be straight or curved, which is usually the case, or crooked, zigzag, or step-like. Occasionally they extend wave-like through several adjacent and parallel fibres. When diastasis of the fibre has occurred, the substance forming these lines can often be recognized at one of the ends of the separating fibre, while the other end may be smooth or finely irregular or ragged. Incomplete separation along the cement lines is also occasionally observed.

In the twelve instances of this series in which the cement substance was plainly visible in the form of narrow or broader lines, while segmentation was not presented, it concerned in the majority of cases decidedly atrophic and pigmented or fattily degenerated hearts from adult persons dying from chronic tuberculosis (two), diabetes (one), and carcinoma (stomach, three; larynx, one), the heart in each case weighing less than normal and in one case only 125 grammes; but this

FIG. 2.



Cement broad; some segmentation and, in the centre, a segment partly broken across. Man, fifty-six, arterio-sclerosis, rupture of aneurism into pericardium; hypertrophy of heart. 500.

condition was also observed in persons dying from peritonitis after bullet-wound (one), from sarcoma of the pons (one), from carbolic-acid poisoning (one), from cysto-uretero-pyelo-nephritis following rupture of the urethra (one), and from cerebral hemorrhage (one).

In quite a few cases typical segmentation producing larger or smaller

segments with mostly clean-cut ends occurs in smaller or larger foci and not generally throughout the parts examined. In some of these specimens the cement lines are visible about the foci of dissociation (Fig. 2). Often a complete cell with its lateral branches is loosened. The width of the space separating the segments may vary considerably. (In some instances foci of segmentation were not found as usual in the left papillary muscles, but elsewhere in the left ventricle; but this was the case only when there were extensive fibrous changes in the papillary muscles.) In some of these cases the heart is otherwise absolutely healthy. In some there are extensive fibrous changes; in some the nuclei are very large, and extensive fatty degeneration may be present. Occasional tears also occur.

From focal dissociation the process may be said to extend through transition stages of slight, then more and more pronounced separation, to well marked, general segmentation throughout the whole left ven-

FIG. 3.



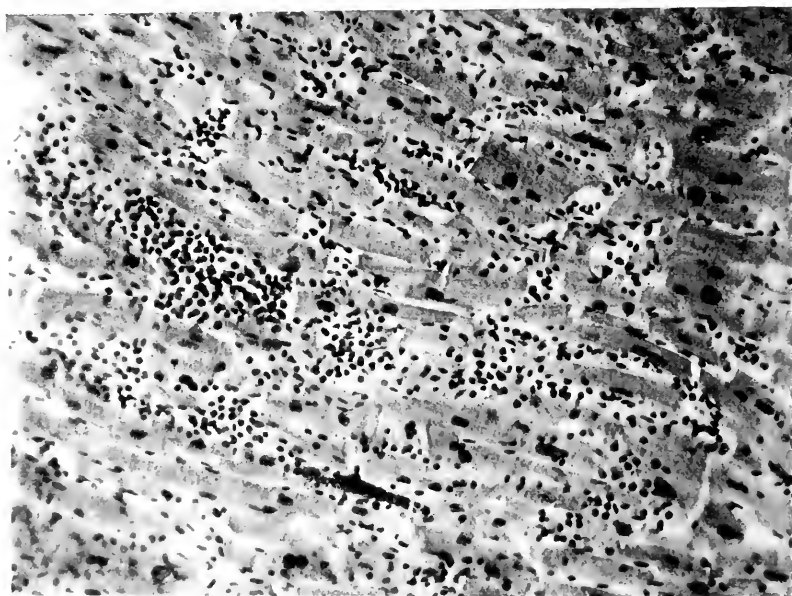
Marked general segmentation with great diastasis of the pieces. $\times 120$.

tricle. In these instances of marked segmentation the change is also usually present in the right ventricle, and in this case it also occurs first and best marked in the papillary muscles. Segmentation is evidently very rarely present in the auricles. The marked frequency with which the papillary muscles are involved is attributed by Israel to absence of antagonistic diagonal fibres.

Typical segmentary dissociation gives rise to segments that correspond quite generally to the outlines of the muscle-cells isolated by means of solution of potassium hydrate. The ends may be straight, concave, or

convex, dentated, or terraced, often finely irregular; lateral processes are present; larger segments, evidently composed of more than one cell, are also found; small square or oblong segments without nuclei, as well as irregular fragments, frequently occur, evidently due to the mechanical fracture of the lateral processes of the loosened segments, but fracture lines very rarely pass near the nucleus (Fig. 3). More or less diastasis of the segments has usually taken place, and the intervening spaces are oftenest apparently empty. Generally the separated pieces maintain a relatively normal position, but sometimes disarrangement has been brought about, due, it would seem, to the contraction of

FIG. 4.



Acute interstitial myocarditis in pyemia. Near lower margin a compact micrococcal embolus (staphyloc. pyog. aur.). Leucocytic infiltration, segmentation, leucocytes between the pieces. $\times 500$.

adjacent fibres after segmentation has occurred and to loosening of the interstitial tissues, allowing the bundles to become mixed (Israel¹). In occasional cases extravasation of red blood-corpuscles has occurred between the ends of the segments—a fact emphasized by Browicz² and others in establishing the vital nature of segmentation. In the vicinity of inflammatory foci leucocytes are found between the ends of the pieces (Fig. 4), and in some cases of ante- or post-mortem bacterial invasion

¹ Loc. cit.

² Loc. cit.

the spaces may be occupied by micro-organisms (Fig. 7). Generally the separation is complete. Occasionally, however, there are faint indications of the presence of a delicate membrane covering the fibre and still holding the ends together—a sarcolemma, the existence of which in the heart-muscle is, following Eberth,¹ usually denied. Oestreich² also notes having observed this delicate membrane. Perhaps the connective-tissue fibrillae become closely applied to the separating muscle-fibres and give rise to the appearance of a sarcolemma.

Otherwise the section of the heart-muscle may appear perfectly normal, the striations being distinct, the nucleus of usual size, the connec-

FIG. 5.



Cement lines broad and visible in a heart the seat of fatty degeneration $\times 500$.

tive tissue and bloodvessels unchanged. In many cases the general loosening of the secondary bundles described by Israel is present; or there may be, depending upon general conditions, such as infections and intoxications, parenchymatous and fatty degenerations (Fig. 5) of the sarcoplasm as well as the changes usually included under the term chronic fibrous myocarditis. In a large number of the cases, particularly in hypertrophy of the heart, with or without chronic myocardial changes, there is noted marked increase in the size and changes in the shape of the nuclei of the muscle-cells. The nuclei may indeed be giants in size.

¹ Loc. cit.

² Loc. cit.

In shape they may be greatly elongated and cylindrical or spread out in the form of oval masses; club-shaped, kidney-shaped nuclei, and nuclei with budding processes and curiously shaped outgrowths also occur; some are vesicular, others stain very deeply, and sometimes they present surface markings, due probably to the imprints of pressure, which may give the nucleus an appearance as though it were to split longitudinally (Fig. 6).

Fragmentation, tearing, or breaking of the muscle-fibres, usually present to some extent in all cases of marked segmentary dissociation, as shown by the presence of small fragments often without nuclei, in

FIG. 6.



Cylindrical and peculiarly shaped giant nuclei; in the centre a cell with vacuolar degeneration of its protoplasm. Man, age fifty, heart weighed 700 gr., fibro-myocarditis. $\times 500$.

some cases occurs to a more marked extent, and may be the predominating form of disunion. The lines of separation may pass through any part of the muscle-cell, often passing around one pole of the nucleus, the margins or ends of fragments being more irregularly ragged than in segmentary dissociation. Incomplete rupture may occur. Fragmentation, strictly speaking, never occurs to such an extent and does not give rise to separation into such minute pieces as does segmentation. It appears to bear the same general relations to acute and chronic diseases as segmentation, and in agreement with Bard, Renant, and others the conclusion seems warranted that it is caused largely by mechanical

rupture or breaking of the fibres on account of various degenerative changes that render the sarcoplasm brittle.

THE DISTINCTION BETWEEN SEGMENTATION AND FRAGMENTATION. In the foregoing the attempt has been made to consistently employ the words segmentation or segmentary dissociation and fragmentation to designate two distinct conditions, each in the main well described by the term applied to it—segmentation referring to the division of the muscle-cells at the lines of junction in the muscle-fibre, fragmentation to the rupture or break of the fibre regardless of the cement lines.

While Renaut¹ and his pupils, Browicz² and others, insist that the interruption of the continuity of the cardiac muscle-fibres that gives rise to the characteristic appearances described by them as *myocardite segmentaire* occurs principally along the lines of union between the single muscle-cells, others claim that the lesion is produced essentially by ruptures or breaks of the muscle-fibres without any special reference to the limits of the individual cells.

Browicz regards all interpretations of segmentation that do not make the limits of the pieces correspond with the limits of the cells as erroneous. He does not lay so much stress on the mere dissociation of the muscle-cells, which probably is an agonal product, as upon vital pathological conditions of the intercellular substance, manifesting itself by the fact that the lines of junction become visible. It may be a homogeneous seam, a broad stripe, or a broader layer whose contours are sharply separated from the ends of the cell. In this space are then found short, stave-like formations running parallel to the long axis of the muscle-fibre ("*breitstreifige, stäbchenförmig gebaute Kittsubstanz*"), and such changes may alternate with distinct dissociation. In this statement Browicz has been in a measure substantiated by Przewoski's³ investigations, which show by special methods that at the ends each muscle-cell has a layer of granules, the *stratum granulosum terminale*. Browicz looks upon these changes in the cement as the initial phase of segmentation.

Eberth⁴ long ago called attention to the fact that in atrophic and pigmented hearts the fibres may separate into single cells without any manipulations, and he ascribes this dissociation to fragility of the cement.

Goebel⁵ also regards segmentation as beginning with changes in the intercellular cement, and the separation as occurring at the lines of union between the cells.

v. Recklinghausen,⁶ Marchand,⁷ Oestreich,⁸ and Bard⁹ lay stress upon

¹ Loc. cit.

² Loc. cit.

³ Cited by Browicz, loc. cit.

⁴ Loc. cit.

⁵ Beiträge zur fettigen Degeneration des Herzens, Centralb. f. Allg. Path. u. Path. Anat., 1893, Bd. iv. p. 728.

⁶ Loc. cit.

⁷ Loc. cit.

⁸ Loc. cit.

⁹ Loc. cit.

the rupture of muscle-fibres as an important step in producing the *état segmentaire* of Renault. In fact, the last two regard multiple ruptures as the essential occurrence. It concerns fragmentation in the strict sense, and not segmentation, and the process does not depend upon changes in the cement substance (v. Recklinghausen¹). Oestreich² found that some of the fragments were so small that they could not possibly be whole cells. Furthermore, that the lines of rupture very often passed across the fibre in the immediate neighborhood of the nucleus, and sometimes in a curve around one pole of the nucleus, half of which would then project into the indentation of the corresponding fragment. He also found that the fragments were more like the artificial muscular bits described by Eberth than like isolated muscle-cells. Finally, he was able by means of the action of acetic acid to demonstrate the presence of unchanged cement lines near rupture lines. Often the rupture would pass across the fibre near the unchanged lines of union.

While Oestreich³ is surely correct in the statement that many fragments are too minute to represent whole cells—fragments without nuclei also occur—as well as in the observation that rupture lines often pass immediately around the nucleus, I have not been able to confirm the statement that the fragments generally resemble artificially produced muscle-morsels nor to demonstrate by addition of acetic acid normal cement lines in all hearts the seat of marked dissociation. Eberth⁴ describes artificial muscular detritus as presenting more clean-cut and more nearly straight ends than the isolated muscle-cells, the ends of which are usually finely irregular, while occasional fibrillæ may project from the ends of forcibly produced fragments, yet the ends of the fibrillæ are not pointed, but cut off squarely. Oestreich uses this statement as a standard in distinguishing between segmentation and fragmentation in human hearts. When making the statement Eberth⁵ does not refer to any special species, but to normal heart-muscle in general. Segmentation is a morbid process. There is, therefore, no inherent reason why it may not cause disunion of the muscle-cells and yet the ends be square and clean-cut. For these reasons no weight can be given the conclusions drawn by Oestreich after comparing the segments of dissociation with the artificial fragments described by Eberth.

Histologists—as, for instance, Schweigger-Seidel, in Stricker's *Hand-book*—also describe normal muscle-cells with smooth ends, and believe the difference in the limiting surfaces to be occasioned by the circumstance that the muscle sometimes comes under observation in a contracted, coagulated condition. I think it will be found that the ends of fragments of the normal human heart produced by force, pressure,

¹ Loc. cit.² Loc. cit.³ Loc. cit.⁴ Loc. cit.⁵ Loc. cit.

tearing, bending, which I presume is what is meant when Eberth speaks of "artificially produced muscular detritus," are strikingly ragged and irregular, the fibrillæ yielding unequally. Furthermore, in typical, general, marked segmentation, such as is shown in Fig. 3, it is not generally possible to demonstrate any cement lines. On the other hand, the outlines of the segments correspond very nicely to the shape and the size of the isolated muscle-cell, which, forsooth, they often are; nor is it usual to find in such specimens that a line of separation crosses a segment in the region of a nucleus. The study of cases of focal or slight dissociation will also be found to substantiate quite fully the statements of Browicz¹ in regard to the coexistence of visible cement lines and actual segmentation. On the other hand, fragmentation in the strict sense also occurs, as acknowledged by Renaut,² although probably not to the extent claimed by Oestreich,³ and here the ruptures very often cross the fibres near the nucleus, and hence probably inside the limits of the single muscle-cells. The nucleus, however, is not always central. It may be found quite near one end of the cell. In many specimens it is also possible to demonstrate the coexistence of cement lines independent of the fracture lines, the ends on each side of the latter being usually very irregular and ragged, as if the fibre had been torn forcibly across, the fibrillæ offering unequal resistance.

The conclusion is therefore in order that segmentary dissociation as well as actual fragmentation or rupture of the fibres of the heart-muscle both occur.

Distinction should be made between typical segmentary dissociation of the heart muscle-fibres, in which softening or complete solution or perhaps excessive brittleness of the cement allows the muscle-cells and segments to move away from each other, and fragmentation in the strict sense of the word, in which it essentially concerns ruptures of the muscle-fibres in any part of their course and without any special reference to the lines of union. This distinction is quite important, because the possibility that fragmentation may be, to a certain and perhaps large extent, artificial, cannot be altogether excluded, while segmentation cannot be produced by the action of ordinary reagents and manipulations. For these reasons I have preferred to deal more with segmentation than with fragmentation. Segmentation and fragmentation frequently occur in varying degrees. In any large series of hearts it will be found that it is quite feasible to separate the specimens into two groups, according as one or the other of these forms of interruption in the continuity of the muscle-fibres predominate; but true segmentation is by far the more frequent.

¹ Loc. cit.² Loc. cit.³ Loc. cit.

THE CAUSES, NATURE, AND CLINICAL SIGNIFICANCE OF SEGMENTATION. The views concerning the nature and the cause of segmentary dissociation have, as noticed, failed to harmonize. It was the earlier belief of Renaut³ that it concerned a primary, nutritive, or chemical change of the cement substance. This view has been supported by his pupils, by Browicz,¹ v. Zenker,² Tedeschi,³ and in part by Israel⁴ and Dunin.⁵

Durand⁶ and Duplax⁷ claimed that in circulatory disturbances more or less permanent œdema of the myocardium may be produced, and the substances contained in the œdematous fluid, such as sarcolactic acid, may dissolve the cement, holding the muscle-cells together in the form of muscle-fibres. Durand⁸ calls attention to the direct action of very feeble solutions of chromic and other acids upon the cement; but Colrat⁹ produced œdema of the heart experimentally without the occurrence of segmentation. Segmentation also occurs in many conditions, such as atrophy of the heart, sudden traumatic death, etc., without the presence of œdema.

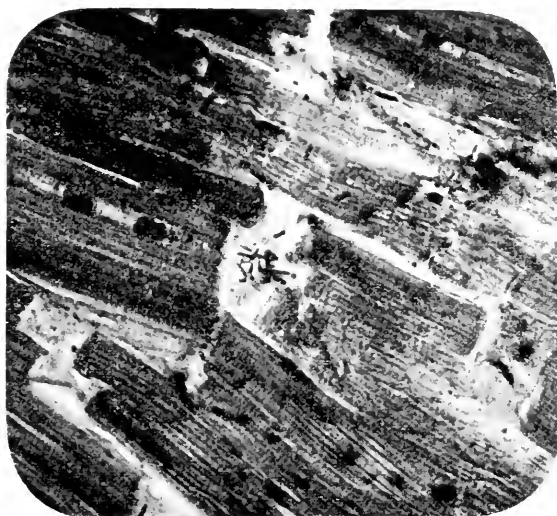
v. Recklinghausen,¹⁰ Oestreich, and Rosenbach¹¹ look upon the change more as a mechanical disunion and rupture of the muscle-fibres on account of disturbances of innervation and irregular contraction in the death agony, favored perhaps by brittleness of the fibres due to degenerative changes. Oestreich¹² says fragmentation does not cause death but the last contraction causes fragmentation. Rosenbach¹³ states that a maximal contraction precedes dissociation, and that it may be regarded as proved that it is due to the crossing of impulses of different nature in a dying heart. When an impulse of excitation meets an inhibitory impulse, separation of the fibre occurs. Letulle¹⁴ expresses the opinion that segmentary dissociation is due to an agonal imbibition of the muscular fibres with sarcolactic acid. Finally Renaut,¹⁵ in his efforts to overthrow v. Recklinghausen's¹⁶ and Oestreich's¹⁷ views concerning the essentially agonal nature of segmentation, advances the claim that it is the last step of a complex, dystrophic, cellular process, involving the muscle-cells and leading to softening and solution of the intercellular substance.

Lepine and Molard,¹⁸ in 1891, described certain degenerative changes in the heart muscle-fibres as a particular species of non-sclerotic, parenchymatous myocarditis. The changes consist in the appearance of clear spaces between the primitive fibrillæ, which are thereby forced apart.

¹ Loc. cit.² Loc. cit.³ Loc. cit.⁴ Loc. cit.⁵ Loc. cit.⁶ Loc. cit.⁷ Loc. cit.⁸ Loc. cit.⁹ Loc. cit.¹⁰ Loc. cit.¹¹ Loc. cit.¹² Loc. cit.¹³ Loc. cit.¹⁴ Anatomie Pathologique (Cœur, Vaisseaux, Poumon), Paris, 1897.¹⁵ Loc. cit.¹⁶ Loc. cit.¹⁷ Loc. cit.¹⁸ Sur une espèce particulière de myocardite parenchymateuse (sans sclérose). Arch. de Méd. Expér., 1891, p. 777.

These spaces are largest near and about the nucleus, which is increased in volume, round, ovoid, or elongated. In consequence of these conditions the fibres, when cut longitudinally, present a bulging enlargement corresponding mainly to the situation of the nucleus. The heart that is described as presenting these changes in typical form weighed 560 grammes, was dilated, and came from a man seventy-eight years old. Segmentation and other lesions are described as absent. Subsequently, however, Renault, in 1894, calls attention to the fact that segmentation was present in all of Lepine's and Molard's preparations, and, based on further studies, he makes the hyperplasmic atrophy or vacuolar disinte-

FIG. 7.



Segmentation; bacilli upon and between the segments; to the left of the centre a cell with vacuolar degeneration and containing two nuclei. Man, fifty, died instantly from crushing injury of abdomen. $\times 500$.

gration and gigantism of the nuclei, described by these authors, steps in a complex process leading to segmentation. The enlargement of the nucleus, the increase of the amount of the chromatin, are interpreted by Renault as evidences of augmented nuclear activity, the muscle-segment assuming, as it were, a more intense "nuclear life," while its function and its structure as a contractile element fall into abeyance, and the intercontractile substance is liquefied. *La cellule vit dès lors bien plus cellululairement que musculairement.* Finally the cell softens or dissolves its cement, which may swell up and become permeable to the corpuscles of the blood and the lymph. The muscle-cell is now functionally incapacitated, and general segmentation is the anatomical sign

and final lesion of cardiac asthenia. The "hyperplasmic atrophy" of Renaut, as well as the special form of parenchymatous myocarditis of Lepine and Molard,¹ would seem to correspond very closely to vacuolar degeneration of the muscle-fibres (Figs. 6 and 7), which is due to a colliquative disintegration of the sarcoplasm. It is often associated with enlargement or vesicular tumefaction of the nuclei, and is generally observed in connection with interferences of the coronary circulation (Letulle²), and occurs probably also in diverse general intoxications. This condition may or may not be associated with segmentation. Incidentally attention may be called to the fact that spaces in the muscle-fibres of the heart very much similar to these vacuoles have been interpreted as capillaries within the muscle-fibres by Meigs.³

Segmentation occurs frequently in association with hypertrophy of the heart, with or without degeneration. Here, also, enlargement of the nuclei, which may assume various shapes, is, as a rule, present. Letulle⁴ states that every muscular fibre that hypertrophies presents a proportional enlargement of the nucleus; and Tangl,⁵ who made his observations upon the left ventricle of the hearts of rabbits, the hypertrophy being secondary to experimental traumatic lesions of the aortic valve, found the nuclei of the hypertrophic cells of varying shape, mostly oval, sometimes with central constrictions. Often the nuclei were very long, and they seemed in general to enlarge with the cells. Furthermore, the nuclei were surrounded by a granular substance that coalesced with the protoplasm of the periphery of the cell in which small vacuoles were occasionally seen. Evidently the enlargement of the nuclei and their richness in chromatin in purely hypertrophic hearts belong to the hypertrophic process, and cannot in general be assumed to be evidence of any "dystrophy" leading to segmentation. According to Tangl, it is not entirely impossible but that vacuolation of the sarcoplasm may also occur in pure hypertrophy.

Finally, it must be borne in mind that segmentation occurs without "hyperplasmic atrophy" and "gigantism of the nuclei," as witness segmentary dissociation of healthy hearts in connection with sudden, traumatic death, as well as in other conditions. Hence Renaut's claim that segmentation depends upon the existence of a special dystrophic process of the myocardium proper, marked by vacuolar changes in sarcoplasm, by gigantism of the nuclei, and by solution of the cement, is to be regarded as rather broad, first, because segmentation occurs in otherwise healthy heart-muscle; second, because although segmentation occurs generally in hypertrophic hearts, often with secondary degenera-

¹ Loc. cit.

² Loc. cit.

³ *The Microscopic Anatomy of the Human Heart*, Transactions of the College of Physicians of Philadelphia, 1891; and *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, 1891.

⁴ Loc. cit.

⁵ Ueber die Hypertrophie und das physiol. Wachstum des Herzens, Virch. Arch., 1889, Bd. cxvi, p. 432.

tive changes, yet it has not been demonstrated that the enlargement of the nuclei observed in such heart-muscle is always dystrophic or degenerative, and not to a large extent progressive and hypertrophic in its nature. The entity of Renault's dystrophic process is, therefore, still questionable.

Segmentary dissociation occurs so frequently in connection with various acute and chronic myocardial changes as to warrant the conclusion that the cement substance may be altered, softened, or rendered brittle by direct action of general conditions as well as indirectly on account of primary or secondary lesions of the muscle-cells. Broad, visible cement layers, focal segmentation, segmentation confined to districts of fatty degeneration in the heart-muscle, dissociation about acute myocarditic foci with leucocytes between the segments, the limited segmentation that occurred around Tedeschi's¹ aseptic wounds of the heart, all point in this direction. Consequently it would seem that v. Recklinghausen's claim that it is not shown that segmentation can occur before the death agony no longer holds good.

It stands to reason that the changes in the muscle-cells must influence the quality of the cement. This seems actually demonstrated in the following case, instances similar to which I could duplicate :

Ambrosius² details the case of a woman, aged forty years, who died ninety hours after the removal of the tubes and ovaries under chloroform. There were fatty degeneration and exquisite segmentation of the heart muscle with vesicular nuclei. The degree of fatty degeneration corresponded nicely to the limits of the different degrees of segmentation, pointing to the presence of a vital, histological variation in the different fibres, and permitting the inference that dissociation occurs in places prepared for it by changes in the muscular tissue.

As the cement becomes changed focal and general dissociation may occur under normal or abnormal conditions of cardiac activity. Diastasis and disarrangement of the pieces may follow in degrees commensurate with the vigor and the irregularity of the contractions. The coexisting brittleness of the sarcoplasm and presence of loosened segments between still contracting muscular bundles may lead to more or less extensive fragmentation. The conditions present in diseased and especially in hypertrophic hearts favor dissociation. Here are lesions of various kinds of the muscle-cells, of the stroma, and of the blood-vessels that may weaken the cement and the plasma of the cells, and also marked disturbances in the vigor and order of the contractions. It is certainly difficult to account satisfactorily for segmentation in cases of traumatic, sudden death in which the heart-muscle is plainly normal

¹ Loc. cit.

² Ein Fall von spät eingetretenen Tod nach Chloroforminhalation nebst Bemerkungen zur Fragmentatio Myocardii, Virch. Arch., Supplementheft, 1895, Bd. cxxxviii.

in its structure. In general it may be assumed, however, that dissociation of the muscle-fibres results from a disproportion between the vigor of the muscular contractions and the muscular cohesion. Segmentation and fragmentation may, therefore, occur in normal heart-muscle if its contractions be excessively violent and irregular, as may be the case, for instance, in hanging, in sudden *exitus letalis* during coitus, in excited states, in delirium, etc., and thus become the immediate cause of death because the heart can then no longer contract. In weakened hearts, violent or irregular as well as quite normal contractions may cause dissociation, suspending further cardiac action; but this cannot be designated a true agonal change in the ordinary sense conveyed by this term.

The views as to the existence of segmentation in a form susceptible of clinical recognition (segmentary myocarditis of Renaut) are divided. Renaut and his scholars claim that in the old the condition occurs in such a typical form that it may be diagnosed, and that it should therefore be regarded as a clinical entity. This view has not gained general acceptance. Primary, independent segmentation is not yet recognized. Aufrecht,¹ in a short article, champions its existence.

Aufrecht describes a case in a man, forty-eight years of age, who died from the general symptoms of heart-failure, with œdema of the lower extremities. In the left ventricle there was universal segmentation, with hemorrhage between the segments, which are stated to have been normal with but occasional cloudiness. There was some hypertrophy of the right ventricle, which he interprets as secondary to the segmentation in the left, although the influence of a moderately marked pulmonary emphysema cannot be excluded.

Aufrecht regards this case as one of primary, independent segmentation of the left ventricle. There exists no ground, he claims, for not believing that a dissociated heart may not work as long as one the seat of parenchymatous degeneration. The muscle-fibres might undergo separation little by little, and the process need not necessarily coincide with the agony.

All the other authors regard general and focal segmentation as an accidental or secondary phenomenon occurring in the course of infections and intoxications in connection with the primary and secondary lesions of asystolic hearts, and with fatal traumatism. It constitutes, as is also shown by the statistics brought forward in this paper, an episode in the course of the principal affection. While it possesses an anatomical individuality, it is so common that it would be difficult to say in what disease it would surely be absent after, say, the twentieth year, and it would take a very long time to enumerate all the diseases in

¹ Ueber einen Fall von primärer Fragmentation des linken Ventrikels, Zeitschr. f. kl. Med., 1891, Bd. xxiv, p. 205.

which it has been found present. Its presence may explain this or that detail in the clinical course of a number of processes, such as the termination by sudden death; but it is secondary, it is not a disease in the strict sense any more than cloudy swelling, for instance, and cannot, therefore, be considered as entitled to a place in our nosology.

General segmentation is inconsistent with the continuance of the heart's action. Its presence in cases of arterio-sclerosis, coronary disease, fibrous myocarditis, etc., that die suddenly, is consequently a satisfactory anatomical reason for the sudden fatal ending. In medico-legal practice cases of sudden death under more or less suspicious circumstances, or without any apparent cause, occasionally occur in which the most careful post-mortem fails to reveal any other explanation of death than general myocardial segmentation, as, for instance, in this example:

An apparently healthy man, twenty-three years of age, was "fooling" with two friends. Two hats were knocked off, and, as one of the men picked up his hat, he observed that his friend—the dead man—had fallen to the floor unnoticed. It was thought that he was shamming, but after waiting three or four minutes it was found that he was dead. At the post-mortem, ten hours after death, and made by Dr. Louis J. Mitchell, all the organs, including the brain, were macroscopically normal. The heart, especially the left ventricle, was flabby and dilated. Microscopic examination showed the heart—unfortunately this was the only organ that could be examined—the seat of a general and typical segmentation.

In this case there is not much doubt that the extensive dissociation caused death, but the cause of the dissociation is not clear.

Ramond¹ reports the case of a thirty-year-old professional runner who fell ill after a run of thirty kilometres on a hot July day. There were fever, dyspnoea, *delirium cordis*, and anuria, death ensuing in a few hours. The post-mortem showed hyperæmia of all the organs and a flaccid, dilated heart. Microscopic examination showed absence of myocarditis, but a marked general segmentation and fragmentation of the fibres, with much extravasated blood. The nuclei stained well, and the transverse striæ were distinct. Ramond regards toxins due to muscular overexertion as the cause of the lesions.

While general fragmentation is obviously inconsistent with continued heart's action, focal segmentation need not, it would seem, of necessity, result in death. Browicz concluded that general segmentation leads to sudden death, but focal to cardiac insufficiency, or, possibly, to rupture of the heart or to fibrous substitution of the separated muscle-cells. The last two conclusions he states he is unable to substantiate.

¹ Dissociation segment. du myocard dans un cas de cœur forcé, *Bullet. et mem. Soc. Méd.*, 1896; abstracted in *Centralbl. f. Allg. Path. u. Path. Anat.*, 1897, viii. p. 236.

Robin¹ found segmentation along the margins of the ruptures in two hearts in which were also endo- and peri-arterial changes. He looks upon the segmentation as the essential cause. Tedeschi² examined the muscle in the vicinity of the ruptures in two hearts. In one instance there were found chronic fibrous interstitial changes as well as scattered foci of fragmentation. In the second case there were no fibrous changes about the point of rupture, but blood-corpuscles were present between the isolated, single muscle-cells. Subsequently Tedeschi had opportunity to examine three additional museum specimens of spontaneous heart rupture, with, he states, the same result as in the last case above. From these results it would seem that, while complete details are not at hand, still, in some cases, segmentation and spontaneous heart rupture stand in such very close relation to each other that the question merits further study.

Of all the parts of the heart, segmentation occurs most frequently in the papillary muscles of the left ventricle. It is often present in a marked degree in these muscles only. If it occur some time before death, the result might be mitral regurgitation, taking it for granted that a dissociated papillary muscle is incapable of contraction, because physiologists in general agree (Landois and Sterling, Curtis, in *The American Text-book*) that it is the function of these muscles, by their contraction during ventricular systole, to hold the mitral valves taut and thus compensate for the narrowing of the cavity of the ventricle. Mitral regurgitation induced in this way may account in some degree for the marked pulmonary congestion so frequently present in cases associated with myocardial segmentation.

If it be assumed that segmentation may occur in foci some time before death, several important questions arise concerning the fate of the loosened cells. Of course the isolated, non-nucleated protoplasmic masses that are often split loose could not maintain their vitality. On the other hand, would the nucleated but dissociated cells necessarily die and become replaced by fibrous tissue? Is the vitality of the muscle-cell dependent upon the integrity of its cement? Could a reunion of the isolated muscle-cells by means of new cement occur? These are questions that cannot be answered at this time. Koester³ remarks that the yellow degeneration (*enartung*) which is followed by scar-formation in the myocardium does not, in slight degrees, differ to any extent from the segmentary myocarditis of Renault. I have studied carefully the appearance of the muscle-fibres in and about myocardial scars, and it has seemed that the fibres, generally speaking, undergo atrophy without segmentation. Segmentation rarely occurs in the muscle-fibres embedded

¹ Loc. cit.

² Loc. cit.

³ Verh. d. X. Intern. Med. Congr., Berlin, 1890, Bd. ii. Abth. ii.

in scars. Any evidences of replacement of muscle-segments by fibrous tissue were not found. It therefore appears reasonable for the present, in view of the uniform absence of any evidence of reactionary changes, to regard even focal segmentation as at the most a product of limited ante-mortem duration. In conclusion the facts brought forward may be summarized as follows:

The cardiac muscle-fibres frequently separate into muscle-cells and irregular fragments. Segmentation and fragmentation are due to disproportion between the vigor and order of muscular contraction and muscular cohesion. They occur in normal heart-muscle due to excessively vigorous and irregular contractions. More frequently they are encountered in association with acute and chronic, secondary, and primary myocardial changes that alter the cement, weaken the plasma, and predispose to dissociation under normal or increased heart's action. General segmentation is of brief duration, because its occurrence is incompatible with further cardiac contractions. Focal or limited segmentation may, perhaps, cause incompetency of the auriculo-ventricular valves, especially the mitral. It may lead to cardiac insufficiency, and, possibly, to rupture of the heart. The fate of loosened muscle-cells is not known. It seems, however, that focal dissociation is of but short ante-mortem duration. The occurrence of primary segmentation as a distinct disease is not proven.

REVIEWS.

LECTURES ON THE ACTION OF MEDICINES: BEING THE COURSE OF LECTURES ON PHARMACOLOGY AND THERAPEUTICS DELIVERED AT ST. BARTHOLOMEW'S HOSPITAL DURING THE SUMMER SESSION OF 1896. By T. LAUDER BRUNTON, M.D., D.Sc. (Edin.), LL.D. (Hon.) (Aberd.), F.R.S., Fellow of the Royal College of Physicians, Associate Fellow of the College of Physicians of Philadelphia; Honorary Member of the Pharmaceutical Society; Physician and Lecturer on Pharmacology and Therapeutics to St. Bartholomew's Hospital. Pp. xv., 673. New York: The Macmillan Company, 1897.

THESE lectures are intended to give a general sketch of the mode in which drugs act upon the body, and should receive criticism from the stand-point of the author. As he very pertinently remarks, "any man who tries to pass an examination upon them alone will not be at all likely to get the maximum number of marks," yet the very attractive style of the author invests many of the dry bones of therapeutics with the interest of more congenial, though less important, subjects. Even if the student must turn to a more systematic text-book, that the sum of his knowledge shall equal the demands of school or State, he will enter upon his more serious study with greater enthusiasm. It is the physician who should read this book, not because it contains much that is new or startling, but for the many suggestions so frequently encountered. For him, more than for the student, the form of lectures is desirable. He can overlook the unimportant and rest when *causerie* displaces instruction, and in its perusal in many instances broaden his horizon and readjust his perspective. Repetitions, then, need not be irksome, nor inadequate treatment become disappointing, for there is enough within the covers of this work to interest even the expert therapist. As the strong points of this book—its suggestiveness, its impressiveness, and its directness in statements of fact—come from the personality of the lecturer, so do its weak points depend upon the form which it takes—that of lectures. These are its sketchiness in places, its failure to record present knowledge, for instance, that upon hypnotics and anesthetics, and finally the insertion of too many anecdotes, based upon personal experiences, some of sufficient variety to suggest that his lot has been marked by unusual circumstances.

We could wish that recent chemical nomenclature had been adhered to. But this can be overlooked when we find that "transfusion" has replaced the usual "perfusion" and that "sternutatories" (p. 237) is almost the only error in orthography. We do not recognize as peculiarly an Americanism that people cough so severely that they "look as though they were going to 'cough up their immortal souls'" (p. 279),

for this would involve a discussion as to the limiting adjective, but to our mind the statement that at the explosion of an oxygen cylinder a "boy was completely blown up by it" (p. 284) is equally objectionable.

In general, the author's facts are well established; exception, probably, could be well taken to the vessels of the brain losing their tone (p. 185). Even if the author's fancy may lead him away from the facts which are strung together by it, we must not lose sight of his earnestness in purpose, though the manner may seem trifling. An addition of real value is found in the illustrations, many of which are both striking and original.

We have read this volume with great interest and profit. We recommend it to the physician, not so much to the student, for him to read and ponder, and he will find that he is opening up new fields and more thoroughly tilling old ones.

R. W. W.

ESSENTIALS OF OBSTETRICS. By CHARLES JEWETT, A.M., M.D., Sc.D.
Illustrated by eighty wood-cuts and three colored plates. 12mo. pp. 350.
New York and Philadelphia: Lea Bros. & Co., 1897.

In the preface to this volume Dr. Jewett distinctly states that he has endeavored to place concisely and clearly in a systematic and logical arrangement the essentials of obstetrics, within easy grasp of the student. He believes that such works have value in teaching, within their proper limit. He has succeeded in his undertaking, and his book forms an excellent introduction to a larger treatise.

His description of the anatomy and physiology of the female genitalia is excellent. We note that in computing the period of gestation he prefers to take the dimensions of the gravid uterus rather than estimate the length of the fetus. In treating of the diagnosis of pregnancy he tabulates the causes for the cessation of menstruation which might be confused with early pregnancy. He carefully describes Hegar's sign, and illustrates the method of examination. In estimating the excreta of the pregnant patient, he believes that quantitative tests for urea furnish the best evidence of the activity of the kidneys. Our experience leads us to fully agree with him in this belief. In treating of pelvic measurements we fail to find a method of obtaining the oblique pelvic diameters by external examination. We have used to advantage the measurement from the posterior-superior spine of the ilium of one side to the anterior-superior spine of the opposite ilium.

In dealing with the presentations and positions of the fetus, we should imagine that the student might be confused by the author's statement of four positions for each presentation and his description of face presentations. It seems very desirable that the number of positions be made as small as possible, and that the clinical phenomena of rotation be made as clear as possible. Our experience indicates that students learn best the phenomena of labor and the reasons for them in this way. In describing the rotation of the head, it is said to be due chiefly to the slope of the lateral halves of the pelvic floor, while the author also recognizes the importance of a firm pelvic floor.

The statement of methods of examination is interesting, and accom-

panied by a number of original illustrations. Minute directions are given for preparing for labor, and we note his caution that mercurial irrigation, if used at all, should be followed by douching with plain sterilized water, to avoid danger of mercurial poisoning. For internal examinations, the author has found the dorsal position best; we have often been able, by turning the patient on the side, to pull back the pelvic floor and make a better examination than in the dorsal position.

The author prefers chloroform for obstetric anæsthesia, and ether for operative cases. He would close lacerations of the cervix when they are accompanied by bleeding. In his description of the preparation of silk in melted paraffin for sutures, we are reminded of the usage of a surgeon long since dead, who employed wax for a similar purpose. The closure of perineal lacerations is illustrated by diagrams.

In treating of the puerperal state, the importance of thorough examination to ascertain that recovery is perfect is urged. The patient is allowed to get out of bed six or eight hours after labor to use a commode, rather than allow the catheter to be passed.

The care of the infant is briefly but clearly given, and Pasteurization of milk in place of full sterilization is advised.

The pathology of pregnancy and of the fœtus follows next, and concise directions are given for the treatment of abortion. Ectopic gestation and the pernicious vomiting of pregnancy are also described. The pathology of pregnancy receives adequate treatment, and contraction of some degree in the pelvis is said to be present in from 10 to 15 per cent. of all cases. In describing the indications for various operative procedures, symphysiotomy is said to be applicable when the true conjugate is above three inches and there is but little contraction in the other diameters. The same operation is again recommended in impacted and irreducible brow presentation. Abnormalities of the fœtus next receive attention. Hemorrhage and eclampsia are thoroughly treated; in the latter the author considers fluid extract of *veratrum viride* a useful prophylactic. He considers it of great value in preventing the paroxysm.

The pathology of the puerperal state naturally includes a description of puerperal septic infection. In the treatment of this condition the value of strychnia is thoroughly recognized.

In obstetric surgery occurs a description of the author's method for performing symphysiotomy; he chooses the so-called open operation, and illustrates it with two excellent drawings. He distinguishes *celio-hysterotomy* from *celio-hysterectomy*, and states that the latter has frequently superseded Porro's operation.

As a whole, the book contains within convenient compass the essentials of modern obstetric practice, and may well be used by the student to prepare him for reading a larger treatise.

E. P. D.

THE EYE AS AN AID IN GENERAL DIAGNOSIS. A Handbook for the Use of Students and General Practitioners. Octavo, pp. 248. By E. H. LINNELL, M.D. Philadelphia: The Edwards & Docker Co., 1897.

THIS work presents the wide relations of the eye in general diagnosis in a way that is likely to command the attention of the mass of general

practitioners. These relations have been understood and appreciated more or less completely by those especially engaged in ophthalmic practice, and attempts have been made to call to them the attention of others, especially the attention of general practitioners, as in Part III., "Diseases of the Eye in Relation to General Diseases," in Nettleship's work on *Diseases of the Eye*, and the chapter by Norris in Pepper's *System of Medicine*. But we believe that nowhere have the essential points been presented so clearly, and with fair completeness, in a separate work of moderate size until the publication of this one.

The book is divided into three parts. The first, including the "Eye Symptoms of Nervous and Constitutional Disease," closes with an alphabetically arranged table of such diseases, with the characteristic eye-symptoms of each. The second part, entitled "Reflex Neuroses," gives a good summary of the remote effects ascribed to eye-strain, a subject that has given rise to considerable literature during the last few years. Part III. deals with "Ocular Affections of Toxic Origin," and the work concludes with a partial bibliography and a good index.

The work is well written and sound in its teaching, although in the part on "Reflex Neuroses" it seems to attach to the deviations from perfect muscular balance an importance that ophthalmic surgeons are by no means agreed to accord to them.

The author is one of the collaborators of the *Homœopathie Eye, Ear, and Throat Journal*, yet a careful reading of the book might not reveal this, for there is not the slightest indication of the peculiar views of Hahnemann. The authorities quoted are nearly all familiar leaders in the literature of modern ophthalmology, and even when the above-mentioned journal is referred to the sectarian part of its name is omitted.

The book has been well printed except that the number and size of its pages might have been reduced somewhat without the sacrifice of anything more important than blank paper. It is illustrated with a few good diagrams, chiefly of the field of vision and nerve-tracts concerned in vision.

E. J.

LECTURES ON ANGINA PECTORIS AND ALLIED STATES. By WILLIAM OSLER, M.D., Fellow of the Royal College of Physicians, London; Professor of Medicine, Johns Hopkins University, Baltimore; author of *A Practice of Medicine*, *Lectures on the Diagnosis of Abdominal Tumors*, etc. Pp. 155, with an appendix. New York: D. Appleton & Co., 1897.

It has seemed to the present reviewer that in the review of medical writings there are times, of far too frequent occurrence, we fear, when the personality of the author, or the reviewer's conception of his personality, is the subject of criticism. In other words, the author is not separated from an impartial review of his work.

In the case of Dr. Osler, however, the individuality of his thought and style of expression render it most difficult for the reviewer to whom his personality is familiar to separate the man from his product. Nor does an attempt to accomplish this seem to us to be advisable, since that which creates the difficulty at the same time obviates the necessity for its correction.

In the monograph at present under consideration there is collected a

series of seven lectures on "Angina Pectoris and Allied States," as they were delivered to the graduate class in medicine at the Johns Hopkins Hospital. The first lecture of the series is mainly historical and nosological in its scope; the second treats of the etiology and general description of the malady; the third describes the phenomena of the attack; the fourth deals with allied and associated conditions; the fifth with pseudo-angina pectoris; the sixth with the theories of the disease; and the seventh and final lecture with the diagnosis, prognosis; and treatment.

Adopting what some one has termed the English style in the extensive report of his cases, the author runs a risk at times of his subject dragging, a crisis averted only by his inimitable style and apt illustration. The historical sketch, enriched as it is with many quotations that only the author's breadth of research and the thoroughness that characterizes his writings in general would lead us to expect, is one of the most interesting lectures of the series.

In all that portion of his subject that bears in any way upon its pathological side Dr. Osler is at his best, and his wide experience is everywhere evident. Here, too, as is usually a feature in most of his writings, a large series of cases occurring within his own experience affords abundant material for illustrating the different phases of his subject.

The value of this contribution to the subject of angina pectoris can hardly be overestimated, as it must constitute a basis upon which further researches in the same line shall be constructed. The author has added another to his many writings that are deemed classical.

T. G. A.

I. RÉSECTION TOTALE ET BILATÉRALE DU SYMPATHIQUE CERVICAL DANS LE TRAITEMENT DU GOÎTRE EXOPHTHALMIQUE ET DE L'ÉPILEPSIE.

II. L'HEMICRANIECTOMIE TEMPORAIRE.

III. LA RÉDUCTION BRUSQUE DES GIBBOSITÉS POTTIQUES.

IV. LA SPLÉNÉCTOMIE.

V. DE LA NÉPHROPÉXIE. DESCRIPTION D'UN NOUVEAU PROCÉDÉ OPÉRATOIRE.

VI. NOUVEAUX PROCÉDÉS POUR LA CURE RADICALE DES HERNIES INGUINALES.

THESE are the titles of six reprints presented to the Twelfth International Medical Congress in Moscow by Prof. Thomas Jonnesco, of Bucharest. They indicate great activity and great boldness. Whether there is also combined with these two excellent characteristics that rather critical judgment which, while it does not reject a thing because it is new, does not necessarily accept it as true because it is new, is possibly a question.

Following the lead of Alexander, of Liverpool, who resected the superior sympathetic ganglion in the neck, Jonnesco has advocated the total bilateral resection of the cervical sympathetic, not only including the superior, but also and especially the inferior and, if it exists, the middle ganglion and the connecting nerve filaments, for both epilepsy and exophthalmic goitre. In Chipault's *Travaux de Neurologie Chirurg-*

gicale for the present year will be found a very elaborate description of his operative procedure, with a number of cuts of specimens showing how complete his resections are. In that paper he has promised to give to the profession his results in detail. The present paper does not give the results in such a form that one can pass critical judgment upon them. The only statement is that he "has operated on twenty-six epileptics and that the therapeutical results have been excellent." In some cases the cure has been maintained for more than a year; others have been markedly ameliorated; always the attacks have become less frequent and less intense; none of them has been aggravated. We confess that it would be more satisfactory to surgeons if details of each case could be given, especially after a considerable time has elapsed.

No less bold is the second paper, on temporary hemicraniectomy, which, however, ought to be called hemicraniotomy. In this procedure he has followed a very able and also bold surgeon, Doyen, of Rheims, who also has a paper on the subject in the same volume of Chipault's *Travaux de Neurologie Chirurgicale*. Jonnesco gives the results in six cases in which he has turned down literally about one-half the skull; usually only upon one side, but in one case on both sides. The bilateral case got well. Of the other six, one died and five got well, a surprising result after so extensive an operation; but we cannot see from the records that they were very much better. The operations were done for epilepsy, microcephalus, and idiocy.

The third paper is in advocacy of Chipault's and Calot's recent method of the sudden reduction at a single sitting of the deformity from Pott's disease. The paper refers to thirteen cases, in which he has done it with certain modifications of the process. Apparently no ill effect has followed. It is, however, in our opinion, by no means a well-decided question that it is a wise procedure. The pictures showing in each a poor little "kid" stretched out on a table, surrounded by five, six, or seven men with pulleys applied to the head and the hips, followed by enveloping the whole body in plaster-of-Paris, certainly excite our sympathy.

The splenectomy paper reports twelve cases; eleven for enlarged malarial spleen and one for a hydatid cyst. Some illustrations are given, showing patients before and after operation, and a number of the spleens are figured. Of the twelve cases nine got well, and apparently their general health was not seriously worse from the loss of the spleen.

The paper on nephropexy describes the operative measure of laying bare the kidney, division of its capsule, and then sewing it and the capsule to the periosteum of the eleventh or twelfth rib. The reviewer can only add that in a considerable number of cases he has done the operation by simply passing sutures through the kidney without such elaborate technique, and has obtained good results.

The last paper describes a modification of Bassini's operation.

W. W. K.

ATLAS AND ESSENTIALS OF GYNECOLOGY. By DR. OSCAR SCHAEFFER, Privat-docent in Obstetrics and Gynecology at the University of Heidelberg. With 173 colored-plate illustrations and 54 wood-cuts. Pp. xviii. 288. New York: William Wood & Company, 1897.

THIS is the concluding volume of a series of five translations from the German by gentlemen whose names do not appear—a peculiarity of this publishing-house. We have always held that when a translator does good work he should at least have the satisfaction of placing his name on the title-page. But this is merely a matter of opinion. To the reader who is familiar with the originals, the colored plates will appear much above the average; in fact, they are quite pleasing to the eye. The translation of the text is above criticism; the condensed style of the author is preserved without the sacrifice of readable English. While the descriptions of operations are of little practical value, the paragraphs on symptomatology and diagnosis are sufficiently comprehensive. The arrangement is original, though convenient. Part I., on Fœtal Malformations, is followed by Part II. (two chapters), on changes in shape and position. Part III. treats of Inflammations and Trophic Disturbances; Part IV. of Injuries and their Sequelæ, including the various forms of fistulæ. Part V., on Neoplasms (three chapters), is fully illustrated by Plates 41 to 59, those depicting the different varieties of malignant disease of the uterus being most valuable.

This book will be particularly useful to the student and general practitioner, and ought to have a wide circulation.

H. C. C.

KING'S COLLEGE HOSPITAL REPORTS, VOL. III. Edited by NESTOR TIRARD, M.D., F.R.C.P.; W. WATSON CHEYNE, F.R.C.S., F.R.S.; JOHN PHILLIPS, M.A., M.D., F.R.C.P., and W. D. HALLIBURTON, M.D., F.R.S.

THIS volume contains eight medical and surgical papers, and some two hundred pages of reports from the different services of the hospital, notes of cases, descriptions of specimens, etc. The special features of this volume are the picture and memorial sketch of the late Sir George Johnson and a description of a new ophthalmological theatre erected and equipped in his memory.

This building includes several new features, the working of which will be watched with interest. The wall is lined with opalite, an opal crown glass, with a face like that of ordinary crown glass, and the back roughened by fusing into it irregular fragments of glass, by which it is fixed to the walls and ceiling. The floor of the room extends some distance under the windows, so that the patient's feet can be thrust into this space and his head brought close to the window as he lies in bed prepared for operation.

Another feature is a closet for keeping the instruments and dressings, the front and back of which are of plate glass, so that everything is kept in strong sunlight, with arrangements for keeping dressings and solutions properly warmed and constantly ready for use.

A considerable part of the matter is of interest only to former graduates of the medical school, as the account of "What Old King's Men are Doing," and even an athletic record of the foot-ball club. In paper, printing, and binding the volume compares favorably with other hospital reports.

E. J.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

REYNOLD W. WILCOX, M.D., LL.D.,

PROFESSOR OF MEDICINE AND THERAPEUTICS AT THE NEW YORK POST-GRADUATE MEDICAL
SCHOOL AND HOSPITAL; VISITING PHYSICIAN TO ST. MARK'S HOSPITAL.

Paraldehyde Delirium Tremens.—DR. G. REINHOLD reports a single instance of this rare condition. A man, forty-one years of age, was taking two ounces of this drug each day. He could stand with difficulty, and although his intelligence was not impaired, his speech was labored, and words were delivered in syllables in order to improve this deficiency. His nutrition was enfeebled, skin pale, and brow covered with perspiration. The eyeballs were deeply sunken, without disturbance of motion, and his look was fixed. The pupils were in mid-dilatation, but reacted well to light. There were no painful points on head or spine. There was marked tremor of hands and tongue, which was coated. Spinal innervation was unchanged. The lungs showed marked emphysema; the apex-beat was absent; the heart-sounds muffled; the pulmonic second sound accentuated; the pulse slightly irregular, ninety to the minute, and moderately full. The abdomen was retracted. The urine was very acid, contained a large quantity of urates, of a specific gravity of 1030, but free from albumin and sugar. The patient was sleepless, became delirious, had ideas of persecution and hallucinations, but improved under sodium bromide and trional, and finally was discharged after sixteen days of observation.—*Therapeutische Monatshefte*, 1897, Heft 6, S. 300.

Treatment of Alcoholism.—DR. N. S. DAVIS believes that (1) the patient should be instructed in regard to deceptive and injurious influences of alcoholic drinks, so that he is actually convinced that their use is, on all occasions, unnecessary. (2) The patient should be placed under good physical and social surroundings. For impaired digestion, irritable nervous system, and disturbed sleep, one-sixtieth of a grain of digitalin with one-thirtieth of a grain of strychnine at each meal, with from twenty to thirty minims of diluted hydrobromic acid at bedtime, will give excellent results. For con-

stipation, thirty minims of fluid extract of *rhamnus purshiana* may be added to the acid. Instead of the digitalis and strychnine, a pill or capsule of a grain of extract of hyoscyamus, with three grains of cerium oxalate, may be given. Before an anticipated period of dissipation a pill of two grains of quinine sulphate, the same amount of extract of *eucalyptus globulus*, and one-third of a grain of extract of *cannabis indica* should be given with each meal for two weeks. (3) The patient should be separated from his associates, and if this cannot be done in any other way, he should reside in a well-regulated asylum for six to twelve months.—*Quarterly Journal of Inebriety*, 1897, No. 2, p. 162.

Nicotine.—DR. J. W. SEAVER cites various authorities giving the effect of this drug upon the nervous and muscular systems, the alimentary tract, glandular activity, and the blood. Dividing a class in college into three groups: (1) non-users of tobacco in any form, (2) those who have used it regularly for at least a year, and (3) the irregular users, he finds that the first group grows in weight 10.4 per cent. more than the second and 6.6 per cent. more than the third. In height the first group grows 24 per cent. more than the second and 11 per cent. more than the third. In girth of chest the first group grows 26.7 per cent. more than the second and 22 per cent. more than the third. In lung-capacity the first group gains 77 per cent. more than the second and 49.5 per cent. more than the third. Among students of the highest scholarship about 5 per cent. use tobacco, while of those who do not obtain college appointments over 60 per cent. use tobacco.—*Quarterly Journal of Inebriety*, 1897, No. 2, p. 132.

Cinchonism.—DR. PIERRE SILLAN reports a single instance. A woman, forty-five years of age, became delirious after taking quinine sulphate, three and three-quarter grains every four hours for thirty hours. The limbs were trembling, but not rigid, pupils contracted, temperature normal, and the pulse eighty and respiration forty to the minute. There had been suppression of urine for nine hours. A tablespoonful, withdrawn by catheter, was thick and high colored, but not otherwise abnormal. Excessive headache and tinnitus aurium were complained of. Later there was vomiting. The symptoms were relieved by potassium bromide and chloral, fifteen grains of each dissolved in camphor-water, of which two doses were given at an hour's interval.—*Therapeutic Gazette*, 1897, No. 7, p. 502.

Rhus-poisoning—DR. JOSEPH H. HUNT recommends the yellow wash (lotio hydrargyri flava, B. P.; corrosive mercuric chloride, 1; lime-water, 243), used in full strength, continuously applied by means of a cloth wet with the lotion, as soon as irritation is recognized. It may not prevent vesication, but it is cooling, and will subdue much of the inflammation. After the acute symptoms subside an emollient ointment should be used. For the febrile condition aconite or gelsemium and quinine may be employed.—*Brooklyn Medical Journal*, 1897, No. 6, p. 392.

Treatment of Snake-bites.—DR. CORISLANO D'UTRA, from a large experience in Brazil, neutralizes the poison, even when it is in the circulation, as is

shown by abundant hemorrhage, deafness, blindness, vertigo, nausea, and almost imperceptible heart-beats, by giving thirty grains of calomel in an ounce of lemon-juice, and repeating this every two hours. After the third dose the patient is out of danger. Of more than one hundred patients, none have died. An infallible preventive is the carrying of one to five drachms of sublimate attached to some portion of the body, which either causes the snake to flee, or should it bite it is harmless. This note was presented by the author in addition to the statements of Fraser as to the properties and curative influence of antivenene.—*Bulletin Général de Thérapeutique*, 1897, 8e liv. p. 368.

The Cutaneous Absorption of Iodine.—MM. LINOSSIER and LANNOIS conclude from their experiments that (1) iodine applied by painting is absorbed by the skin. This absorption, very small when the painted part is exposed to the air, becomes much more active when it is hermetically covered. The maximum of absorption takes place at the time of the application. (2) The superficial alteration of the epidermis produced by the tincture of iodine, provided it does not go on to destruction of the corneous layer, appears to be an obstacle rather than an aid to absorption. Under the most favorable conditions the absorption is too irregular to make the painting of iodine useful in general iodine medication. (3) Iodoform and ethyl iodide are absorbed by the healthy skin, the latter in sufficient quantity to be useful, if needful, for a general iodine treatment.—*Bulletin Général de Thérapeutique*, 1897, 9e liv. p. 385.

Eucaine.—DR. G. SCOGNAMIGLIO presents a very excellent report which embodies the observations of previous experimenters. He shows conclusively that it is less toxic than cocaine, and that the resulting anæsthesia is as rapid, complete, and intense as that of the latter drug, and is diffused through a larger area. His general conclusion is that it is a better and cheaper local anæsthetic.—*L'Nuovi Remedii*, 1897, fasc. 1-3, pp. 3, 18.

DR. E. T. MELLISH states that this drug is chemically compatible with the following substances: Phenol, trikresol, guaiacol, naphthol, salol, ichthyol, formalin, iodoform, such hydrocarbons as petroleum, vaselin, benzene, fats and fatty oils, ethereal oils, camphor and terpenes, alcohol, glycerin, ether, chloroform, chloral, alkaloids, and alkaloidal bodies. It can be sterilized by heat, and appears to be permanent in solution.—*The Therapist*, 1897, No. 5, p. 49.

Treatment of Sciatica.—DR. ALBERT ROBIN calls especial attention to the use of hypodermatic injections of sodium glycerophosphate, 1, in distilled water, 4. As alternatives he offers the following formulæ: 1. Calcium, magnesium, and potassium glycerophosphates, of each, .04; sodium glycerophosphate, 13; and (2) iron glycerophosphate, .05; calcium, magnesium, and potassium glycerophosphate, of each .08. Of the three formulas he prefers the first, which is less irritating. The others are more active, but cause marked pain. He generally commences with twelve minims, which is usually sufficient; if necessary, doubling the dose. The solutions should be prepared in small quantities as needed, but can be preserved in small, sterilized bottles,

each containing a single dose. All aseptic precautions should be observed, and the injections should be made deeply *in loco dolenti* and successively along the course of the nerve, so far as it is painful. The pain may not yield after the first nor the second, but will after a series of injections. The cure is usually complete and persistent.—*Bulletin Général de Thérapeutique*, 1897, 10e liv. p. 433.

Treatment of Acne.—DR. S. EHLMANN, after mentioning various remedial measures intended to improve the general conditions, recommends the following formula: Resorcin, 3; adeps lanae hydrosi, 15; ointment, 5, which is of thick consistence, and should be left in place for fifteen hours. In the interval washing is allowed, but only with mild soap. Besides this ointment systematic opening of the pustules should be carried out, and when opened the cavity should be treated with a small drop of a 20 per cent. solution of carbolic acid in alcohol.—*Therapeutische Wochenschrift*, 1897, No. 19, S. 457.

The Waters of Bourbon-l'Archambault.—DRS. RIGAL and POURRAT report the results of their observations as follows: The water flows at a temperature of 125° F., and contains about one-sixth of its volume of carbon dioxide and 4.42 per cent. of fixed residue. Of the latter, 2.34 per cent. is chlorides, 1.34 per cent. bicarbonates, with silicates, sulphates, and iron oxide in small quantities. The waters are harmful for marked tuberculous lesions, but of manifest utility for rheumatism in all its forms, even when complicated by heart-lesions. Neuralgia and especially sciatica are generally cured. They are useful in lesions consecutive to fractures and dislocations. They have some influence upon the pains of tabes dorsalis. They are certainly useful in peripheral neuritis, paralysis, and hemiplegia. Baths and douches are the methods employed in the treatment of the above-mentioned conditions.—*Archives de Médecine et de Pharmacie Militaires*, 1897, No. 6, p. 339.

The Action of Phosphorus in Chlorosis and Anæmia.—DR. ANGELO CASATI notes that failures in the use of iron are frequently met with in these conditions, and these appear to be dependent upon the absolute loss of appetite. The restoration of the appetite is brought about by phosphorus, and then sufficient iron can be absorbed in form of the ordinary medicinal preparations or in the foods which contain iron, as meat, eggs, lentils, and red wine. The best method of administering the remedy is as the phosphorated oil in gelatin capsule, each containing one sixty-fourth of a grain of the drug. The treatment is begun by giving one capsule each day, and every second day increasing by one capsule until five are taken each day. Then the dose is diminished in the same way until the initial dose of one capsule is reached. If the appetite is not permanently benefited after ten days, the treatment is repeated.—*Gazzetta degli Ospedali*, 1897, No. 4, p. 37.

Treatment of Palpitation.—DR. HENRI HUCHARD treats this symptom according to its cause. The palpitation of toxic origin (coffee, tobacco) or from drugs (quinine) disappears when the cause is removed. If it is of gastro-intestinal origin and generally nocturnal, due to dyspepsia, with excess of hydrochloric acid, alkalies in sufficient dose and regulation of diet

are necessary. Iron does not produce palpitation unless in consequence of its intemperate administration, as in dyspeptic chlorosis it produces or accentuates a drug gastropathy. Since it is true that there is no part of the body which may not be the cause of cardiac palpitation, it is necessary to investigate all possible causes before attributing a lesion to the heart. Of these lesions which are accompanied by palpitation (acute aortitis at its commencement, acute endocarditis and pericarditis, pericardial adhesions, obstruction or insufficiency at the mitral valve), the symptoms of cardiac erethism are benefited by a pill of one and one-half grains of quinine hydrobromate, three-fourths of a grain each of powdered digitalis and extract of convallaria, twice to four times daily.—*Revue Général de Clinique et de Thérapeutique*, 1897, No. 18, p. 276.

Commelina.—MR. ALFONSO HERRERA has made a chemical analysis of this Mexican plant. In the extract was found a proteid principle and potassium chloride, which apparently possesses hæmostatic properties. The theory of action suggested is that the proteid principle of the plant mixed with the effused blood, whose alkali reacts upon the former, affords a separation of ammonia, which contracts the bloodvessels; the potassium chloride contained adds its action to that of the ammonia. The drug is used in the treatment of menorrhagia and hæmoptysis, as an active remedy in leucorrhœa, and as a general hæmostatic in capillary hemorrhage. The extract is given as a pill of one or two grains, of which twenty-four to forty-eight each day are taken. Injections are of the strength of from 1 to 16 to 128.—*American Journal of Pharmacy*, 1897, No. 6, p. 290.

The Influence of Morphine Upon Hydrochloric Acid of the Stomach.—DR. F. K. KLEINE shows, from experiments on dogs, that morphine markedly delays gastric digestion, and when continued diminishes the secretion of hydrochloric acid. The facts are independent of each other, for we may find after ten days a large secretion, while the digestion was severely affected on the fourth day. The latter may be explained on account of the motor paralysis of the stomach, which secondarily affects the mucous membrane by the fermentation which is set up. If this condition is lasting, then the hydrochloric-acid secretion gradually diminishes, and in long-continued morphinismus ceases. If the drug is stopped and the mucous membrane restored to health, the secretion of acid commences and increases gradually.—*Deutsche Medicinische Wochenschrift*, 1897, No. 21, S. 321.

Absorption of Iron.—DR. R. LÉPINE cites many observations which prove that iron, when administered hypodermatically, is absorbed. He then reports an instance of the hypodermatic administration of a daily dose of two to two and one-half grains daily of iron citrate in a 4 per cent. aqueous solution. The improvement was rapid. The treatment was well borne, probably because the percentage of the solution employed was low.—*La Semaine Médicale*, 1897, No. 25, p. 197.

Treatment of Severe Dysentery.—MM. F. J. BOSC and V. VEDEL recommend the use of intravenous injections of salt-water, reporting four instances

of their use. They conclude: 1. Large injections (40 to 60 ounces) of sodium chloride, seven *per mille*, constitute an energetic treatment. 2. They should be made early and repeated, so that they will develop sustained general reaction and a modification of the general condition which can lead to recovery. Three of the four patients treated survived, although all appeared to be hopeless; the fourth, although *in extremis*, lived longer and was brought into better condition through this treatment. 3. There are no contraindications to this treatment, but care should be taken as to the quantity used and the rapidity with which it is injected. Too large injections are dangerous, and from one and one-half to three ounces each minute should not be exceeded.—*La Presse Médicale*, 1897, No. 51, p. 288.

Quinine in Uterine Inertia.—DR. H. A. HARE, in summing up the results of answers to inquiries addressed to eight prominent obstetricians, concludes that it is not a first-rate uterine stimulant, and that for this reason its ordinary contraindications are so great as to limit its oxytocic usefulness. It evidently only acts as a stimulant to the general system, as would alcohol or other drugs of similar stimulant power.—*Therapeutic Gazette*, 1897, No. 7, p. 433.

Treatment of Syphilis by Intramuscular Injections of Corrosive Mercuric Chloride.—DR. CARTIER makes use of the following formula: Corrosive mercuric chloride, 1; sodium chloride, 3; distilled water, 20; in dose of nearly one grain of the drug, which is injected into the retro-trochanteric region. This has not caused even the smallest abscess, although severe pain may occasionally be met with. Intramuscular injection should be the treatment of choice in that there is introduced into the organism a known amount of the drug in a condition to be fully utilized. The syphilitic manifestations yield rapidly, not only in severe cases, but in facial manifestations. The injections should be repeated every eight days, exceptionally in five, and four injections are sufficient to relieve the patient of contagious lesions, and six or eight for serious cases—those refractory to ordinary treatment or under unfavorable hygienic conditions.—*Revue de Théraputique Médico-Chirurgicale*, 1897, No. 11, p. 361.

Hæmato-catharsis in Broncho-pneumonia.—DR. E. HOUËL reports a single instance of the successful use of this method in a child, aged six months. Four ounces of a seven *per mille* solution of pure sodium chloride in boiled distilled water, under antiseptic precautions, were slowly injected in the scapular region. The following are offered for consideration: 1. Subcutaneous injections of artificial serum, slowly made, are not contraindicated in pulmonary disease. 2. Age is not a contraindication. 3. Given at an early period of the disease, they increase the chances of cure; they are useful even in the last stages. 4. They seem to determine a crisis such as normally occurs (polyuria, diarrhoea, sweating, and amelioration of symptoms) with defervescence. 5. The administration is possible for rural physicians so long as the syringe can be sterilized. 6. It is important that asepsis should be obtained, so that there may be no recrudescence of the fever from septicæmia or abscess from septic hands. 7. If this method is employed *in*

extremis, it is likely that so good results will be obtained that physicians will not wait until the patient is *in articulo mortis*.—*Revue de Thérapeutique Médico-Chirurgicale*, 1897, No. 11, p. 357.

The Use of Hydrastis Canadensis in Bronchial Catarrh.—DR. M. SAENGER has found that in the early stages of acute attacks the remedy is useless, but so soon as the expectoration loses its mucous character and becomes muco-purulent or purulent it is of great value. In these cases it markedly diminishes the inclination to cough, lessens the expectoration, renders it less consistent, and aids it to return to its mucous character. The physical signs are also improved after the administration of the drug. The bronchial irritation is more promptly removed than by opium, and with no unpleasant after-effects. The modification of the expectoration is at least equal to that produced by other expectorants, and as an anticatarrhal remedy it is superior. The fluid extract is preferred in from twenty- to thirty-drop doses, four times daily, in sweetened water.—*Centralblatt für innere Medizin*, 1897, No. 17, S. 401.

Treatment of Catarrhal Diseases by Guaiacol Carbonate.—DR. NIED has treated twelve adult female patients, in age from twenty-three to seventy-five years. Some of these suffered from acute bronchitis and others from influenza. The dose varied from seven to thirty grains, twice daily. The effects were seen generally upon the second, latest upon the fourth day. The appetite returned, and then commenced an abundant expectoration of mucus, which ceased within fourteen to twenty days. The patients were discharged as cured in two or three weeks. Besides these six nuns were treated, two of the ages of seventy-nine and eighty-one, who received fifteen grains of the drug twice daily for three weeks. Beneficial results were noted upon the third day. These very favorable results should encourage a further trial of the drug in acute bronchitis and other catarrhal diseases.—*Allgemeine Wiener Medicinische Zeitung*, 1897, No. 22, S. 244.

Nascent Ammonium Chloride in Pneumonia.—DR. JOHN ASHEURTON CUTTER reports a single instance of the use of this remedy, which was generated by shaking together two cloths, the one wet with strong ammonia and the other with commercial hydrochloric acid; the nascent ammonium chloride then appeared, like smoke, in the room, and was inhaled. The author believes that this substance is a germicide, and therefore destroys the parasites of the disease; the free ammonia is a tonic and stimulant to the lungs, the acid supplies the deficiency of chloride, and, finally, this method does not disturb the patient.—*Albany Medical Annals*, 1897, No. 7, p. 360.

Treatment of Gonorrhœa by Injections of Argonin.—DR. H. M. CHRISTIAN recognizes two conditions which are present: (1) The gonococcus, the exciting cause; and (2) the catarrhal inflammation of the mucous membrane resulting from destructive action of the gonococcus upon the epithelium; both must be considered in order to insure success. From the use of this remedy in eighty acute and ten chronic cases he concludes: 1. That it is absolutely unirritating, and can be used in from 1 to 10 per cent. solutions.

2. In the great majority of cases it very rapidly lessens the discharge. 3. The gonococci disappear after a short period. 4. This disappearance is not in all cases permanent; there is in quite a large proportion of cases a tendency to relapse with reappearance of the gonococci. 5. It possesses a distinct value as a hand-injection in the stationary period of the disease, but is of very little benefit in the mucous stage or stage of decline. 6. It produces no results in the treatment of chronic anterior urethritis.—*Therapeutic Gazette*, 1897, No. 7, p. 447.

Plant-dialysates.—DR. A. JAQUET collects green plants in good weather, contuses and places them in the apparatus for fourteen days, first with water and next with diluted alcohol. Chemical analysis shows that the dialysate contains a definite percentage of the active principles of the plants. He has tested two specimens of belladonna and aconite and one each of veratrum, digitalis, and adonis, by physiological methods, and finds them advantageous for accurate dosage.—*Correspondenz-Blatt für Schweizer Aerzte*, 1897, No. 11, S. 326.

Formaldehyde Gas.—DR. H. C. WOOD states that the chief interest in this drug centres in its powers as a germicide and disinfectant. As a gas it will penetrate not only animal tissues, but almost all organic substances, so that books infected with various pathogenetic germs could be disinfected by being shut up for fifteen minutes in an atmosphere containing the vapor of commercial formalin (40 per cent. aqueous solution of formaldehyde), one part to three hundred of air. The method of Trillat is the preferable one, and consists in the use of the formaldehyde directly after its production by the passage of the vapors of methylic alcohol over red-hot metal. Kinyoun has shown that none of the ordinary fabrics are injured by the gas, which is capable of completely disinfecting curtains, carpets, clothing, bed-covering, and the minor forms of furniture, although it is doubtful whether heavy upholstered furniture, such as sofas and mattresses, can, in their interior, be thoroughly disinfected. The gas is so irritating that no one can remain in the room during the disinfection, but the lamp employed is automatic and can be left to itself. It can also be used for the removal of foul odors; $\frac{1}{2}$ to 1 per cent. solution is sufficient for cleansing vessels in the anatomical laboratory. If the hands be washed with it and afterward with alcohol, they are rendered completely antiseptic, but are not stained or irritated. It does not affect instruments, and it is efficient in preparing catgut and surgical dressings. For the cleansing of an infected wound a 2 per cent. solution is used, but for a continuous local application or free irrigation, one-fourth of 1 per cent. is sufficient.—*University Medical Magazine*, 1897, No. 9, p. 605.

Tribromophenol Bismuth.—DR. HUGO FINK prefers this antiseptic and desiccant to iodoform for all purposes for which he formerly used the latter drug. There are no unpleasant after-symptoms, as eczema or dermatitis, the discharges lose their odor and lessen in quantity, and wounds heal rapidly with a flexible cicatrix. There is no odor, nor do exuberant granulations form. —*Wiener klinischer Rundschau*, 1897, No. 20, S. 331.

MEDICINE.

UNDER THE CHARGE OF

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Acute Yellow Atrophy of the Liver, with Changes in the Spinal Cord.

—Much interest attaches to changes in the cord in diseases depending upon a general intoxication. GOLDSCHIEDER and MONTER (*Fortschritte der Medizin*, 1897, No. 14) report the following: Female, aged eighteen years. Syphilitic lesion three months ago. Entered the hospital on account of increasing weakness and drowsiness. The patient was of small size, icteric, liver increased and very tender. Later the liver became smaller in size, then jaundice became very intense, and at the end of three months the patient died in coma. At the autopsy there were small hemorrhages in the peritoneum, the spleen was enlarged, the kidneys swollen, the liver weighed 840 grammes. The dura was stained yellow; arachnoids reddened. Microscopically, marked interstitial increase in the liver; the parenchyma in part gone. Complete fatty degeneration of the kidneys. Throughout the entire length of the cord the neuroglia elements, especially about the vessels, were increased in size, but not in number. The parenchyma showed occasional diffusely distributed swollen axis-cylinders and localized patches of degeneration, especially marked in the cervical region. No change in the anterior or posterior roots. The vessels were intact. It is to be noted that the parenchyma changes were limited to the terminal parts of the end arteries, and that the glia changes were qualitative and not quantitative, as shown by the lack of any increase in the number of nuclei. These changes, the author thinks, are toxic. They correspond very nearly to those found in fatal anæmias. In some of the areas shown to be degenerate by the bright yellow color given by the potassium bichromate no microscopical changes could be found. This is explained by saying that in their earlier stages the changes were only chemical, and were brought out by the reagent. This case shows that in acute yellow atrophy the cord may show changes which seem to be, like the atrophy of the liver, the result of the severe general intoxication. The precise nature of the poison remains in doubt, but the changes in this case were unquestionably due in some way to the syphilis.

The Narrow Aorta.—SUTER (*Archiv für Experimentelle Pathologie und Pharmakologie*, vol. xxxix. Nos. 3 and 4) has undertaken the measurements of the aorta in a large number of cases, with a view of determining if any relation exists between the narrow aorta and certain forms of anæmia in which there are subjective symptoms without blood-changes. While he

fails to find any such relation, his results are interesting in connection with the "narrow aorta" of Rokitsansky and Virchow. Suter has gone thoroughly into the question, and in his tables has taken into account age, sex, and size of the individuals. He has measured the aorta in 2719 cases and tested the elasticity of its wall in 105. He concludes in part as follows:

1. The size of the aorta varies with age and sex, and in those of the same sex with the size of the individual.

2. It is not true that those who die of puerperal fever, typhoid, carcinoma, or phthisis have narrow or wide aortas.

3. The power of contracting when the blood-pressure is removed—*i. e.*, the elasticity of the organ—decreases with age.

4. There is no such thing as the narrow aorta in the sense of Rokitsansky and Virchow. The size of the organ in the cadaver does not correspond to its size in life, and measurements from the autopsy chamber cannot be substituted for them.

Case of Fatal Potassium Chlorate Poisoning.—JACOB (*Berliner klinische Wochenschrift*, 1897, No. 27) reports the following case: A seamstress, aged thirty-nine years, was admitted in an almost comatose condition; face was ashy, lips, fingers, and ears cyanotic; tongue blue-black; blue and copper-colored spots on the temples; marked dyspnœa, thready pulse. The patella tendon reflexes absent. During the four days of the patient's life there was almost complete anuria, from 25 to 50 c.c. being passed daily. The characteristic methæmoglobin bands were plainly seen. Many corpuscles were present at first; later they diminished, but at the end the urine contained methæmoglobin, hæmoglobin, and traces of hæmatin. On the third day there was pain in both hypochondria, without enlargement of the liver or spleen. The patient died suddenly on the fourth day. On entrance the blood-count showed 4,425,000 red corpuscles and 84,000 whites. The second day the reds had sunk to 1,825,000, and the whites sank steadily to about normal before death. On the first day no very marked changes could be seen in the erythrocytes. On the following day normally colored reds were scarcely to be found, and many shadows, in part arranged in rouleaux, were present. There were, too, many fragments of red corpuscles, partly free and partly contained in the corpuscles, in the form of spheres. These forms increased so that finally there were large masses of débris. The white cells were often filled with the disintegrated reds. The stained covers were not so striking; the whites, however, looked swollen and had pale nuclei. The stained reds were so irregularly stained that many seemed to be colorless and to contain granules. Toward the end the preparations looked like poorly fixed covers. The author's finding agrees generally with that of others. He differs, however, from Riess in thinking that the increase in the white cells may be a reaction-leucocytosis. The author claims that potassium chlorate is a dangerous drug and that its use should be restricted, especially in pediatric practice.

Relation of Albumosuria to Fever.—SCHULFESS (*Deutsches Archiv für Klinische Medizin*, vol. lviii, Nos. 4 and 5) has endeavored to solve the problem of the relation of albumosuria to fever by finding out how often albumose occurs in the urine of patients with fever and how frequent is its occurrence

in those with no fever. He thinks that 75 per cent. of the cases of albumosuria in the literature had fever; and although such figures are only to be received with caution, they point to a connection between the two. In the author's own work urines containing albumin were carefully excluded. After the reaction was determined any mucin or nucleo-albumin was removed by acetic acid; the filtrate was then carefully tested for albumin. If none was found, 25 to 30 c.c. were mixed with five to six volumes of absolute alcohol, stirred, and allowed to stand for twenty-four hours, filtered, the precipitate dissolved in warm water, and the filtrate again tested for nucleo-albumin, and with the biuret reaction. Of fifty-six cases with non-febrile disease, forty-three, or 77 per cent., had no albumose. In the fifty-nine cases with febrile diseases, 90 per cent. had albumose. The acute infectious fevers, as scarlet, diphtheria, typhoid, were especially noteworthy. In these the albumose curve coincided very nearly with that of the fever.

The Excretion of Lepra Bacilli.—WEBER (*Deutsches Archiv für klinische Medicin*, vol. lviii. Nos. 4 and 5).—The appearance of several sporadic cases of leprosy has lately given a new interest to the question of the manner of the spread of this disease. Experiments to prove the contagious nature of the disease have so far been contradictory. If leprosy is really contagious and caused by Hansen's bacillus, the bacillus must leave the body in such a way that it can be transferred to others. To find in what way the germ does leave the body the author has examined, by the Ziehl-Nielsen method, all the secretions, the blood and tissue-fluids, the skin, scales, and hair. Bacilli were found in blood from the diseased tissue, in vesicles from the diseased tissue, in scales from the skin, in lanugo hairs, in sweat, and in semen.

From the above it is clear that the germs are excreted in various ways. Whether they are in a condition to cause leprosy anew has not yet been definitely shown.

Experiments with the Modern Treatment of Prostatic Hypertrophy.—CASPAR (*Berliner klinische Wochenschrift*, 1897, No. 27) discusses the effects which modern methods of treatment—castration, tying the vasa, and feeding with the gland-substance—have upon prostatic hypertrophy, and has tried to throw some light upon the question by experimenting upon animals. We know nothing about enlarged prostates in animals. The important thing is to bring about a reduction in the size of the gland, whether at the expense of the normal or pathological tissue is of no consequence. For the reason that enlarged human prostates always contain normal tissue, experiments upon normal glands will be of value. One may assume that the prostate bears the same relation to the genitals in men as in the lower animals. Experiments done so far have for the most part shown that castration is followed by atrophy of the prostate gland. Animals for experimental purposes must be chosen with the greatest care, as the structure and size of the prostate vary with age. The author experimented upon twenty-one dogs and rabbits, and found that double castration always caused atrophy of the prostate. Bilateral excision of the vasa deferentia had once a similar, although more delayed, result. In two other cases, however, no atrophy was to be found. The tying of the vas had no effect upon the testis during the four months the animals were

observed. Unilateral castration, unilateral vasectomy, and feeding the gland-substance had no influence whatever upon the prostate. Caspar disagrees with Sakur, who claims that with the loss of the testis-function something is withdrawn from the system that is necessary to the maintenance of the prostate. As agreeing with experimental and clinical facts, he adopts the view of Pezewalski, who holds that the division of the nerves of Cowper which accompany the vasa brings about an atrophy of the prostate, but not of the testis. The author declines to draw any practical conclusions from his experiments, and thinks it is too early for any accurate deductions from the clinical material so far at hand.

Cholecystitis Typhosa.—VON DUNGERN (*Münchener medicinische Wochenschrift*, No. 26, 1897) has been able to find four cases of cholecystitis in which the Eberth bacillus could be shown to be the cause. To these he adds the following: A woman, aged forty-six years, had typhoid fever in 1882; in 1887 she began to have severe attacks of cardialgia with vomiting. The same trouble recurred again the next year, and again in 1889, this time with icterus. No symptoms in 1895, when there was a periostitis of the lower jaw with necrosis. In October, 1896, there was colic, and in the region of the gall-bladder a tumor the size of a child's head, which proved to be an abscess connecting with the gall-bladder. The pus contained typhoid bacilli in pure culture. The blood-serum of the patient was very active, causing a complete Widal reaction in a dilution of 1 to 80, although the patient had had no typhoid for fourteen years. The author thinks it most likely that the bacilli entered the gall-bladder during the typhoid fever fourteen and a half years ago, and remained entirely latent for five years, causing the various attacks since.

It is possible that the primary affection may have been gall-stones, and that the gall-bladder was secondarily infected, forming a "liver typhoid," which did not involve the intestine because the germs were of low virulence and because the patient had an increased resistance due to the previous typhoid.

Etiology of Multiple Sclerosis.—BLUMREICH and JACOBY (*Deutsche medicinische Wochenschrift*, No. 28, 1897) have studied the histories of the cases of multiple sclerosis in Gerhardt's clinic, with especial reference to trauma as an etiological factor in this affection. In all twenty-nine cases were analyzed; twenty-three were men and six women. The fact that several times the affection began in childhood serves to bear out the theory of Ziegler, that multiple sclerosis arises upon the basis of a congenital disposition. Many of the cases had had infectious diseases; in only one, however (influenza), could any connection be made out between it and the onset of the multiple sclerosis. There was but one undoubted syphilitic. Six times there was a possibility of an intoxication, and two were alcoholics. All were carefully questioned as to trauma; eleven had been subjects of injuries. Five times the disease followed promptly upon the injury, in a sixth the multiple sclerosis followed at once upon the trauma; but this latter was due to a sudden dizziness. In the other five cases the trauma occurred a long time before the onset. Although the etiology of multiple sclerosis is not yet clear, the authors

think there can be no doubt that a relation exists between acute infections, intoxications and trauma. The trauma may cause the anatomical changes upon which the disease depends, or it may only occasion the breaking out of an already existing disease; again, it is possible that the trauma only plants the germ of the affection which may require a second influence to give it typical characters. On the other hand, it may be that the relation is the reverse, and that the giddiness and uncertain gait of the disease cause the trauma. A knowledge of the causes of multiple sclerosis will be of value in the way of prophylaxis and for treatment.

Roentgen Rays and Acute Dilatation of the Heart.—SCHOTT (*Deutsche medicinische Wochenschrift*, No. 31, 1897) in 1890 published a series of experiments showing that an acute dilatation of the heart could be caused by severe exercise. He was at that time obliged to depend entirely upon methods of physical diagnosis. Now he publishes a series in which the results of physical examination are corroborated by means of skiagraphs and diagrams from screens. The results showed that after exercise the heart was enlarged in all diameters, in one case as much 3.5 cm. laterally. The right ventricle not only showed the greatest increase in size, but its enlargement came on first and disappeared before that of the left ventricle. A bicycle ride of 5½ km. in twenty-three minutes caused a dilatation of 2 cm. in the right ventricle, and the apex to move outward 1½ cm.; a walk of 1½ km. in thirteen minutes, on the other hand, while causing a sweating as marked as the riding, brought about no increase in the size of the heart.

Anatomy of Gout.—RIEHL (*Wiener klinische Wochenschrift*, No. 34, 1897), opposing the view of Ebstein, says that in gout urate crystals are deposited in unaltered living tissues, and that the assumption that necrosis of the tissues must precede the deposit of the salts must be given up. Whether the tissue increase about the urate deposits is due to mechanical or chemical irritation is not yet clear. Gouty nodules are probably formed about as follows: First, a deposit of crystals in the lymph-spaces and vessels and in the connective tissue itself, due to this inflammation of the surrounding tissue with granulation tissue and giant cells. The author thinks that the failure of others to find urates in the healthy tissues is due in part to their having examined tissues from the cadaver, and in part to faulty methods of hardening.

Stomach Tetany and Autointoxication.—This affection is tolerably rare, about forty cases having been reported, of which not more than eleven are considered pure. The cause of the spasm is in doubt. The view that it is an intoxication has the most adherents, and is the one entertained by the author. If this theory is correct one would expect to find the poison in the stomach-contents and in the urine. GUMPRECHT (*Centralblatt für innere Medizin*, No. 24, 1897) has studied these secretions in a nineteen-year-old workman, who had dilatation from pyloric stenosis. The patient had typical tetany spasm lasting several hours and slowly disappearing through several days. The author reviews the literature of the subject and gives in detail the methods used in his own work. In conclusion, he says: "Neither

the stomach-contents nor an alcohol extract of it injected into animals had any toxic effect. A mixture of albumoses and salts, obtained by precipitating with alcohol, had pronounced toxic properties. These albumoses, however, could not have been absorbed, as they were not to be found in the urine of the patient. An autointoxication, therefore, could not be referred to them. The urine was twice as poisonous as normal urine; however, urine from the same patient at a time when he had no spasm was equally poisonous. It could not be determined what part of the effect was due to the urinary salts, because the ash was more toxic than the original urine. On the other hand, the virulence of a possible organic poison could not have been very great, for when injected into the portal vein only 7 per cent. more of the urine was required for a fatal effect than when it did not first go through the liver. In short, no poison was found at the time of the tetany that could be looked upon as a cause of an autointoxication.

Yellow Fever.—HABELBERG (*Berliner klinische Wochenschrift*, Nos. 23-26, 1897) contributes the result of twenty-nine complete autopsies made at Rio Janeiro in the last two years. He has examined all the organs macroscopically and microscopically. He finds the changes usually described in the liver and spleen, but thinks none of them are characteristic of yellow fever. The very slight involvement of the spleen is very striking. There is no alteration in the relation of the red and white corpuscles. The blood contains bile before it is seen in the urine, but careful spectroscopic examination fails to show any trace of hæmoglobin in the blood-serum. A bacteriological examination of the stomach-contents revealed the presence of a bacillus that, after having once been recognized, he was able to find in every case. If 1 to 2 cm. of the stomach-contents of a patient with yellow fever is injected into a guinea-pig, the animal dies, and his blood contains a pure culture of the bacillus found in the stomach. The micro-organism in question is a very small, slender bacillus, about $1\ \mu$ long and from 0.3 to $0.5\ \mu$ wide. They grow, as a rule, singly. It is colored by all the basic aniline dyes, but not by Gram's stain. It grows upon gelatin plates as fine points in twenty-four hours. It is a facultative anaërobe, does not liquefy gelatin; 1 cm. of a bouillon culture kills guinea-pigs in twenty-four hours. The kidneys are reddened; the stomach is markedly injected, and sometimes there are small hemorrhages. The spleen is but slightly affected. Whether the animal is killed by an injection of the stomach-contents of a yellow-fever patient or the culture, the same germ is always found in the heart-blood in pure culture. The cultures are fatal to white mice. Rats are not very sensitive, and chickens are entirely immune. The filtrate from an old bouillon culture has no effect on guinea-pigs. Animals were able to take the cultures pure without injury if the mucous membranes were intact. The author has been able to protect animals from fatal doses of the germ by injections from patients with yellow fever. This, the author thinks, shows that we are dealing with the specific germ of yellow fever, and that we have a solid basis for a future serum therapy.

The Multiplicity of the Primary Lesion of Syphilis.—SACK (*Berl. klin. Wochenschr.*, 17 May, 1897) calls attention to the statement in Eichhorst's

Handbook of Special Pathology and Therapeutics, that a very characteristic point in the differential diagnosis between hard and soft chancres is that the former is "almost always" single and "very rarely" multiple. He believes that this statement is likely to mislead many, and particularly students, and reports an interesting case of his own in which there were as many as fifteen separate hard chancres on the genitalia. That multiple hard chancres are not so uncommon was shown in 1858 by Ricord, who published the statistics of Fournier and Clere. The proportion of single to multiple hard chancres in Ricord's 456 cases of syphilis was 3 to 1; in Clere's 267 cases, 5 to 1. The proportion in the cases of syphilis that have come under Sack's observation has been about the same as Clere's, namely, 5 to 1. With the exception of two cases, one reported by Ricord and Fournier with nineteen, and the other by Mauriac with sixteen separate hard chancres, Sack's case presented the largest number of initial lesions yet recorded.

The patient, a man, aged twenty-two years, had had coitus eight days before he came under observation. Previous to coitus he had itching of the genitalia due to scabies, and remembered that at the time of connection he had a few small excoriations on the prepuce due to scratching. The increase of the itching and the appearance of several excoriations on the penis led the patient to consult Sack in Heidelberg. The patient, on first examination eight days after coitus, presented excoriations on the abdomen and genital region, the result of scratching. On the scrotum just to the left of the penis were two small abrasions of the skin. The dorsum of the penis and the border of the prepuce each presented two similar lesions. None of these, however, were to be differentiated from simple excoriations. There were five small abrasions at the coronal sulcus which were attributed to a balanitis.

The diagnosis at this time was that of scabies and balanitis, for which the case was treated.

In four days the scabies was cured, and all the abrasions excepting those at the coronal sulcus were healed. The patient, however, was kept under daily observation for a period of five weeks. During this time fifteen separate, typical hard chancres appeared. They made their appearance at different times, some during the third week and others as late as the sixth week after coitus. Eleven of them occurred at the seat of abrasions already mentioned. The lymphatics leading from the penis were hard and thickened, and the inguinal glands, particularly on the left side, on which most of the chancres were situated, were enlarged and presented a board-like hardness.

The interesting features presented by the case, according to Sack, are, first, the multiplicity of the initial lesions; second, the strong probability that several initial lesions may occur in syphilis from a simultaneous infection, and in addition a support to the view that an initial sore may give rise to others by autoinoculation, which is also supported by the observations of Köbner, Keyes, Pontoppidan, and others. Sack believes that the chancres developing in the sixth week after coitus probably developed from those of the third week by autoinoculation.

Lead-poisoning.—PEL (*Centralblatt für innere Medicin*, 1897, No. 23) reports three cases illustrating the difficulty of recognizing lead-poisoning when the

history is not clear. The first was a shoemaker, who acquired an intoxication from holding pewter-coated nails in his mouth. A cigarmaker, who rolled cigars on a pewter-covered board, and held the knife with which he cut them in his mouth between whiles, had typical plumbism. The third case was that of a diamond-worker, who, for fifteen years, was employed in fixing the small diamonds in a warm lead mass; the fingers were kept moist with saliva. This patient left the diamond factory, and five months later was attacked with acute lead-poisoning. The case is interesting on account of the latency of the poison. Pel points out the great variation in the susceptibility of different individuals to plumbism. The cases reported must have been poisoned with very small quantities.

The Florence Reaction.—POSNER (*Berliner klinische Wochenschrift*, 1897, No. 28) describes the crystals obtained by the Florence test for semen. He adds an iodine-rich solution of iodine and potassium iodide to fresh semen or to a watery extract of the stains, and obtains numerous dark-brown crystals of various forms—rhombic tablets, fine needles. These crystals have a great value for forensic medicine. The reaction does not depend upon the presence of spermatozoa in the fluid. It may be obtained from the seminal fluid in cases of complete azoospermia as well as from the secretion of the prostate. The crystals must come from some chemical body, and the idea that they might come from spermin seems to be borne out by the fact that the addition of the reagent to a solution of spermin phosphate gives typical Florence crystals. Extracts from spermin-containing organs (ovary) gave also a positive result.

Richter has tested many of the other substances found in semen. One of the decomposition-products of lecithin (cholin) yielded typical crystals. The Florence reaction should be of aid in doubtful cases, but cannot be certainly relied upon, as it is given by other substances than semen.

The New Tuberculin.—SCHULTZE (*Deutsche medicinische Wochenschrift*, 1897, No. 28) has tried to limit his cases, as recommended by Koch, to those whose temperature has never been over 38° C. He has subjected nine such patients to treatment for periods varying from one to two months. The treatment has not had the bad effects that sometimes come from the old tuberculin. During the treatment one case acquired a tuberculous ulcer of the larynx, one a severe diarrhœa, probably tuberculous. Four remained unchanged. In one a pleurisy was improved. The last two improved. It is too early to say how many of the changes in the condition of these patients was due to the tuberculin.

Bussinius reports from B. Fränkel's clinic the results of treating nineteen patients with the T. R. tuberculin. In fifteen of the cases the cure was complete—that is, they began with $\frac{3}{100}$ mg. and increased to 20 mg. The author thinks the dose should be increased more gradually than by the method of doubling it each time. Eight of the patients gained in weight and five lost. There was quite a marked tendency to reaction after the injection, different samples of the tuberculin varying greatly in this respect. Neither blood nor albumin was ever observed in the urine. Locally, there were no abscesses, but several times painful infiltrations. The cough improved

twice, but no changes in dull areas could be made out. No marked changes were observed in the pharyngeal or laryngeal cases. There was a slight tendency to diminution of the swelling. Three cases of lupus seem to have been considerably improved.

SURGERY.

UNDER THE CHARGE OF

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Congenital Blood Cyst of the Neck and Axilla.—K CZANOWSKY (*Deut. Zeit. für Chir.*, Band xlv. Heft 3 u. 4) reports an interesting case of an apparently congenital cystic tumor, which occupied the left supraclavicular and infraclavicular areas in a four-months' old child. Puncture with a hypodermic needle produced a severe hemorrhage, which was difficult to control. The cyst was evidently in communication with the subclavicular vein. It was rapidly increasing, and there seemed to be great danger of its rupture and the death of the child. Operation, on the other hand, seemed too dangerous and wellnigh impossible from the amount of hemorrhage that must necessarily occur. The author consequently attempted to compress the tumor by the application of cotton and a compressing bandage. His efforts were successful; the tumor decreased one-half its size in six weeks, and in four months nothing remained. There has been no return and there is no trace of the growth at present. The child is now six years old.

Aneurisma Arterio-venosum Ossificans Traumaticum.—FICK (*Deut. Zeit. für Chir.*, 1896, Band xlv. Heft 3 u. 4) reports a case of arterio-venous aneurism of the femoral artery and vein, which occurred in the service of v. Mantouff and which presented the peculiarity of ossification in the wall of the aneurismal sac.

The patient had a fall, with a severe bruise of the lower third of the thigh. Swelling and marked ecchymosis followed, with pain upon pressure. The swelling subsided, but a small tumor remained, which was painful on pressure and also on motion, interfering with the usefulness of the limb. The tumor lay on the inner aspect of the thigh, at the junction of the middle and lower thirds, adherent to the bone, with no discoloration or swelling of the soft tissues surrounding it at the time of entering the hospital.

The history and bony hardness of the tumor led to a diagnosis of osteo-

sarcoma. The operation was attended with much bleeding, and it finally became necessary to tie both the femoral artery and vein. During the operation the femoral artery was successfully sutured after a linear tear. The recovery after the operation was complete, with a restoration of the circulation, with only a slight temporary oedema. The tumor was found to be an arterio-venous aneurism, with bony deposits in its walls.

Incarcerated Retroperitoneal Hernia.—SCHULTZ (*Deut. Zeit. für Chir.*, Band xlv. Heft 3 u. 4) reports an interesting case of retroperitoneal hernia which simulated in a marked manner incarcerated inguinal hernia.

The patient, when first seen, had a marked swelling in the inguino-scrotal region and symptoms of intestinal occlusion. The swelling, however, disappeared to a great extent upon the application of cold. There persisted, however, a swelling in the inguinal lymphatic glands of the right side which were not present on the left. The persistence of the symptoms of obstruction with the presence of these glands, as formerly noted by Rose, led the author to a diagnosis of an internal incarcerated hernia on the right side. There was a marked induration at a point just above Poupart's ligament about its middle. This and the presence of vomiting, distention of the abdomen, and absence of stools led the author to operate. The operation disclosed a retroperitoneal pocket with a sharp upper edge, which was about the size of a walnut; it was filled by a knuckle of small intestine. The intestine was distended above and flattened below, while the strangulated portion was markedly discolored, but not sufficiently so to necessitate resection. The recovery was complete, though retarded by slight suppuration about the catgut sutures.

Suppuration from Sterile Catgut.—From experiments performed in 1895, ORLANDI (*Cent. für Chir.*, February 13, 1897) showed that there is produced by the introduction of sterile catgut into animal tissues (1) an acute reaction which is of little moment and is to be explained by the chemical reaction produced by the agents employed in sterilizing and preserving the catgut. 2. A reaction which has nothing to do with the preparation and sterilization of the catgut, but is produced by bacteria or the results of their action upon the tissues. These bacteria and their products are present in the catgut before its sterilization, and can give rise to so marked a chemotactic action that a true abscess-formation, with an outpouring of leucocytes, is produced, while the catgut is still sterile and benign.

The author publishes the results of a further series of experiments which he has undertaken with the purpose of determining if the reaction produced by the catgut present in a sterile field will influence the development and biological action of infecting bacteria which by any chance infect the previously sterile field.

The observations were confined to experiments with the bacillus coli and the staphylococcus pyogenes aureus, and led the author to the following conclusions:

1. The area in which the catgut is introduced forms easily abscesses, with a tendency to rapid necrosis.
2. The micro-organisms are somewhat altered in their development and virulence.

3. If the animals were inoculated with virulent cultures intravenously, instead of at the area where the catgut was introduced, there was produced an infective reaction at the point where the catgut was introduced.

This, however, did not take place if the inoculation was subcutaneous and in an area which was neither in the same circulatory area nor contiguous to the wound-area.

The Union of Reimplanted Bone Buttons after Trephining.—By a carefully conducted series of experiments DAVID (*Archiv für klin. Chir.*, 1896, Band liii. Heft 4) has proved that the buttons of bone which have been entirely removed from the skull unite when reimplanted under aseptic conditions in a manner analogous to the reparative action seen in other tissues, and that there is neither an entire new formation of bone nor any necrosis of the implanted fragment.

These results were obtained by operating upon a series of dogs which were killed at regular intervals of one week, from four days to fourteen weeks after the operations had been performed. He thus secured a series of histological specimens which clearly demonstrated the fact related and that the process of repair was a normal aseptic union between the fragment of bone and the remainder of the skull, and that there was no absorption or necrosis of the fragment, but that it remained intact and became united to the other bone.

Castration in Enlargement of the Prostate.—JONES (*Annals of Surgery*, March, 1897) communicates the results which he has obtained in four cases of enlarged prostate.

The first patient was sixty-seven years of age, and had suffered for years with urinary disorders which had obliged him to retire from business a year previous to operation. When first seen the bladder was found distended, reaching above the umbilicus. There was no history of overflow, but he passed two or three ounces of urine several times a day and almost half-hourly during the night. The urine was alkaline, putrid, and loaded with mucus and contained pus. The passage of the catheter was not attended with great difficulty, although clearly obstructed at the mouth of the bladder. His prostate was as large as a Newtown pippin, presenting a marked convex protrusion in the rectum, hard and unyielding, painful to touch. His scrotum was covered with herpes. The operation was delayed until the herpes was cured. There was nothing extraordinary in the operation; both testicles were removed. In a fortnight's time the prostate had sensibly diminished in hardness and he had less pain. His urine presented less fetor and purulent deposit. The residual urine diminished in six weeks to one-fourth its usual amount, and two months after operation he felt comfortable and able to dispense with the catheter. A later examination showed the prostate reduced one-half. There was barely any residual urine, and he could retain his urine for hours.

The second case was a patient, sixty-five years of age, who had led a catheter life for five years, and frequently suffered from retention and at times from decomposition of the urine. The case was complicated by double inguinal hernia. Double castration was performed; the prostate was the size of a hen's-egg before operation, and three months later was reduced to about

one-half its previous dimensions. In a fortnight the bladder commenced to act, and in six weeks no occasion for a catheter existed.

In a case fifty-six years of age, with a complication of stone in the bladder and prostate, he divided the vas. Although no marked decrease was noted in the prostate, there was an amelioration in symptoms, more especially in regard to the diminished residual pool. Later, by a suprapubic incision, a large phosphatic calculus was removed from the bladder and another smaller one from the prostate, with considerable benefit.

The fourth case, though recent at the time of writing, showed marked signs of improvement, and the author says that his experience in castration for enlarged prostate, judged in the light and promise of four cases, is distinctly a happy one, and should, he ventures to think, encourage a more frequent recourse to it.

Apophyseal Ligation.—CHIPAULT (*La Méd. mod.*, October, 1896) describes an operation for the treatment of different forms of spinal curvature, which he has found very successful.

The operation he describes as follows: A longitudinal incision is made along the line of the posterior spinous process, extending two or three vertebrae above and below the curvature. Without injuring the intraspinal ligaments the muscles are dissected away and held apart by strong curved retractors. The posterior face of the vertebrae is thus exposed. Extension and counter-extension are now made by two assistants, one grasping the patient in the axilla and the other by the lower extremities, with the same care as would be exercised in placing in position a plaster-of-Paris jacket, until the curvature is obliterated.

When this reduction has been accomplished a silver-wire suture, of a size suitable to the individual case, is passed beneath the intraspinal ligament, above the first vertebra which it is desired to fix, and as near to the base of the spinous process as it is possible to come. The wire should be more than twice the length of the wound. Each half should now be made to cross the other beneath the intraspinal ligament in the next space, and this continued, the wires crossing in each intraspinal space, until the last vertebra is reached which it is desired to fix, when the wires are fastened by tightening them and securely twisting them together. It is essential to pass the wires in each case as close to the base of the apophysis as is possible, and to exert sufficient tension at each step to maintain the spines already ligated in a fixed position.

In dealing with a cyphoscoliosis the method is modified simply by reducing the scoliosis, and after placing the above ligature, returning with one end, which has purposely been left long enough, along the lateral spines of the vertebrae on the side of the former convexity, and maintaining them in such a manner as to prevent the return of the scoliosis.

The author has performed nine of these operations for the following conditions: six ligations for Pott's disease; one ligation for rheumatic arthritis of the middle cervical vertebrae accompanied by torticollis; one for a rachitic lumbar cyphosis; one for a severe form of infantile rachitic scoliosis.

The author does not intend to say that this should be the treatment for all

cases of spinal curvature. These ligatures are not applicable to all forms or cases of Pott's disease, of cyphosis, or of scoliosis; numbers of cases are cured by other more simple means, as by means of gymnastic exercises and other usual forms of treatment. This method is not sufficient of itself, but requires the use of well-applied splints and jackets, in accordance with the severity of the case.

Two Cases of Nephrotomy for Anuria.—CHEVALLIER (*La Méd. mod.*, October 28, 1896) reports two cases of nephrotomy for anuria. In the first case the patient was a man of tuberculous diathesis, whose urine decreased from three ounces to one and one-half ounces in spite of injections of serum and caffeine. Both kidneys were diseased, especially the left, and it was this one which he incised.

He did a nephrotomy, as it was impossible to make out the form of the kidney and reach the pelvis in that manner. He closed the wound after having introduced a drain. The patient died fifteen days after the operation, of pulmonary disease, caused by taking cold. The autopsy showed that of the two kidneys the only one whose ureter was patulous was the one upon which he had operated, and that only after the operation.

In the second case the patient was a female, sixty-three years of age, the subject of lithiasis and of a lithæmic family. She came into the hospital in a state of coma, with myosis and an enormously distended kidney. He performed a nephrotomy similar to the one described above; his finger entered directly into the pelvis of the kidney. The pelvis was washed out and drained, and the patient made a good recovery.

The author concludes that nephrotomy is the operation of choice in cases of anuria which threaten life. They have the value of an *anus contra naturæ* in the case of gangrene of the intestine. They save the situation as Pousson has shown. The fistula is closed by a secondary operation.

Comparative Value of Suprapubic Puncture and Cystotomy in Acute Retention of Urine.—LEGUEN (*La Méd. mod.*, October 28, 1896) divides these cases according to the obstruction, as follows:

1. Acute retention due to prostatic lesions.

(a) In cases in which the bladder is distended and the urine stagnated, and attempts with different forms of sounds and with Gely's apparatus have been unsuccessful, and something must be done to relieve the pain, puncture should be resorted to. The puncture may be repeated two or three times a day for four or five days, if necessary. Frequently such treatment will make it possible to pass a sound later.

(b) In other cases catheterism is impossible. There are false passages and the prostate occludes the urethra; the patient should not be allowed to remain at the mercy of punctures; suprapubic cystotomy should be immediately performed, though in some cases it may be used only secondarily. This should be done even in cases of clear urine after puncture has been tried for four or five days without catheterism being made possible. It should also be done when catheterism is not well supported.

2. In lesions of the anterior urethra the course to pursue is to attack the obstacle by an external urethrotomy without a sound, if necessary, and the

posterior part of the urethra should be found. If the posterior end is not readily found, a suprapubic cystotomy should be performed and then by a retrograde catheterism the end found and the urethrotomy completed.

3. In case of a lesion of the posterior urethra he performs an external perineal urethrotomy with the aid of a staff. Cystotomy and retrograde catheterism are indicated in certain cases, as of traumatic origin, as in fracture of the pelvis.

In *résumé*, he says: 1. Hypogastric puncture is an excellent device; but it is expectant treatment to be used in emergency. It is without effect upon the lesion which is responsible for the retention.

2. Suprapubic cystotomy is a palliative and, at the same time, a curative measure. It is indicated in cases of infected prostatitis where there are false passages, and in cases where repeated catheterism has not re-established the urethra. It is the first step in many operations upon the posterior urethra. It is the second step in certain operations on the anterior urethra.

Iodides in the Thyroid Gland.—WEISS (*Münch. med. Woch.*, January 5, 1897) comments upon the richness in iodides of the glands of the inhabitants of Breslau, as shown by the researches conducted in the clinic of Prof. Ponfick. The amount of iodide was determined in the thyroid glands of adults who died from various causes, in persons suffering from goitre who died from an intercurrent disease, and in infants.

In fifty adults who died from sixty to seventy-seven years of age the desiccated thyroid weighed, on the average, 7 gr. 2, and contained 4 mgr. 0.04 of iodide. The average weight of the thyroid gland of the inhabitants of Silesia is, therefore, less than that of the inhabitants of Berlin (7 gr. 4), and of Freiburg (8 gr. 2), and greater than that of the inhabitants of Hamburg (4 gr. 6.) On the contrary, the average amount of iodide contained in the thyroid glands of the inhabitants of Breslau is greater than that of the inhabitants of Hamburg (3 mgr. 83) and of Freiburg (2 mgr. 5) and less than that of the inhabitants of Berlin (6 mgr. 6).

In the case of patients suffering from goitre the amount varied according to whether the patient had or had not been treated previously with the iodides. In those, to the number of nine, who had not been treated by the iodides, there were found traces, in two cases, and quantities varying from 6 to 11 mgr. In eleven cases treated by the iodides the amount found was from 12 to 18 mgr. In children under seven years the amount varied from traces to 0 mgr. 0.07 to 0 mgr. 0.78.

Congenital Fibro-papilloma of the Sole of the Foot.—DUJET (*La Méd. mod.*, November 4, 1896) reported the following interesting and rare case to the French Surgical Society: the patient, a boy, fifteen years of age, had a congenital tumor on the sole of his foot, which was painless, and of the thickness of four or five fingers; it occupied the entire sole of the foot and extended up on the sides and toes. It was traversed by deep furrows. The veins of the leg and thigh were exceedingly varicose, and were as large as one's thumb, and had the appearance of a cirroid aneurism. The neoplasm made its appearance in the patient's third year, as small white elevations, hard, and the size of a pin's head in the centre of the foot.

Extirpation seemed impossible on account of the tenderness of the scar and the attending contractions. The author decided to remove it by abrasion. He employed a histological section-knife, after having removed the greater part of the tumor in small pieces with strong scissors. At the end of a few weeks fresh healthy granulations sprung up, and he succeeded in covering them by Thiersch's method of skin-grafting, and the patient is now able to walk, two years since the operation, without any pain or injury to the surface, and without recurrence.

The Causation of Chloroform Syncope.—After a careful and comprehensive study, HILL (*British Medical Journal*, April 17, 1897) comes to the following conclusions :

1. Chloroform produces a primary failure of the circulating mechanism and a secondary failure of the respiratory centre. The respiratory centre fails to act not only because it is damaged by the drug, but because of the anæmia of the spinal bulb produced by the fall of arterial tension. This is proved by the fact that the action of the respiratory centre can be renewed by raising the arterial tension. The depth of anæsthesia depends, as does the paralysis of the respiratory centre, on the primary fall of the arterial tension.

2. Chloroform, more than any other known agent, rapidly abolishes the vascular mechanisms which compensate for the hydrostatic effect of gravity.

3. Chloroform abolishes these mechanisms by paralyzing the splanchnic vasomotor tone and by weakening the action of the respiratory pump. When these mechanisms are totally abolished the circulation is impossible if the subject be in the feet-down position.

4. Chloroform also produces paralytic dilatation of the heart. It acts directly like amyl nitrite on the musculature of the whole vascular system.

5. There are two forms of chloroform syncope : (a) during primary anæsthetization. The patient struggles, holds his breath, raises the intrathoracic pressure, congests his venous system, lowers his arterial tension, and finally takes deep inspirations and surcharges his lungs with chloroform. In the first stage the left heart becomes impoverished ; in the second stage it is suddenly filled with blood. This is drawn from the lungs, and is full of chloroform. The chloroform passes into the coronary arteries, and the heart is thrown into paralytic dilatation. Respiration and the pulse either cease simultaneously or the pulse before respiration. (b) During prolonged anæsthetization this arises from gradually giving chloroform to too great an extent. The arterial pressure falls lower and lower, and, secondarily, the respiration ceases because of the anæmia of the spinal bulb. The heart is not in this case paralyzed by chloroform, because the drug is taken in gradually by the shallow respirations and distributed slowly by the feeble circulation.

6. Artificial respiration and the assumption of the horizontal position, if applied in time, will always resuscitate a patient from the second form of syncope.

7. Artificial respiration, established with the patient in the horizontal position, is also the treatment indicated in the first form of syncope ; the heart should be rhythmically compressed by squeezing the thorax. If this does

not quickly lower the pulse, the patient should be put into the vertical, feet-down posture. The dilated right heart is thereby completely and easily emptied of blood. Artificial respiration is maintained during this manœuvre, and the patient is brought once more into the horizontal posture. By rhythmic compression of the chest an efficient circulation is maintained through the coronary arteries; by first emptying and then filling the heart a fresh supply of blood is brought into that organ. If this does not prove successful on the first trial, it can be repeated.

8. Inversion—that is, placing the subject in the feet-up position or compression of the abdomen—will increase the paralytic dilatation of the heart. In this kind of syncope both these forms of treatment are worse than useless.

9. In the condition of shock or emotional fear the compensatory mechanism for the effect of gravity is almost abolished, and chloroform may easily be the last straw to completely paralyze the circulation.

10. Vagus inhibition of the heart is of no importance as an agent in the production of chloroform syncope.

11. Ether is in every respect a far safer anæsthetic than chloroform. According to Binger's experiments on the heart, ether is fifty times less dangerous than chloroform.

12. With the practical conclusion of the Hyderabad Commission, that the chloroform inhaler should be removed during the struggling of the patient or when the respiration is of irregular depth, I am in absolute agreement; but I consider their interpretation of their own experiments and tracings concerning the origin of chloroform syncope to be mistaken.

Not only the work of all physiologists, but also the tracings of the commission, when rightly interpreted, prove that paralysis of the circulatory mechanisms, and not of the respiratory centre, is to be dreaded by the anæsthetist.

Uretero-pyelo-neostomy.—Among the tendencies of modern surgery the true conservatism of the aseptic and antiseptic era is the most marked of all advances.

BAZY (*Revue de Chirurgie*, May 10, 1897) draws particular attention to this fact in connection with operations on the kidney, in which, instead of performing nephrectomy, the attempt should be made in many cases to preserve the kidney in all its functional activity, illustrating the fact that if it is a great surgical feat to remove a viscus or a portion of the viscera it is a greater scientific achievement to preserve it and restore its function.

He reports two cases in which there was a large hydronephrosis. In the first he was enabled to re-establish a communication between the pelvis of the kidney and the bladder by resecting the ureter and implanting the distal portion into the most dependent portion of the dilated pelvis. This was accomplished in the following manner: Through a median laparotomy the tumor was reached, the fluid withdrawn by an aspirator, and the pelvis of the kidney incised. The orifice of the ureter was found far up on one side. It had been flattened out by the pressure of the pelvis and occluded in this manner. A fine catheter was passed through it nearly or into the bladder. The ureter was then resected. One side was cut open for a little way to enlarge the entrance and procure a larger surface to implant into the pelvis. An opening was made in the most dependent portion of the pelvis. A soft

catheter, from which the tip had been removed, was passed a short distance into the ureter, while the other end passed out of the abdominal wound and gave, through an opening situated in the catheter within the pelvis of the kidney, exit to the urine in both directions. Drainage being provided in this manner, the ureter was stitched to the pelvic wall by interrupted catgut sutures, while a Lembert suture of silk was placed externally, care being taken not to penetrate the mucous surface so that the silk would come in contact with the urine. The wound in the pelvis of the kidney was stitched to the abdominal parietes, which were then closed by the ordinary layers of interrupted catgut and silkworm-gut sutures. The patient made a slow but complete recovery, the urinary fistula closed, and the complete function of the ureter was restored.

The second case was one of single kidney of the bi-lobar form. Nephrectomy was impossible, and, although the patient's condition was very poor, the attempt was made to restore the ureter. The kidney was, however, the seat of an infection, and the patient succumbed to a general infection, although the ureter was readily found, the operation performed, and the flow of urine re-established into the bladder.

Wire Hooks for Holding Open the Edges of Abscesses.—As a substitute for gauze tampons or drainage-tubes, BRAATZ (*Centralblatt für Chirurgie*, 1897, No. 16) recommends the employment of retractors formed of wire, which he finds hold the lips of the wound open more certainly and give better drainage than either gauze or rubber tubes, both of which are compressed by the edges of the wound, so that they do not fulfil the purpose for which they were employed.

These retractors are made of different sizes, and are held apart by a band of wire which passes from one to the other. They may also be made in spiral form for deep drainage, or gauze and rubber drainage-tubes may be employed at the same time, being inserted between the retractors. The author has employed them in numerous cases with gratifying results.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF
J. SOLIS-COHEN, M.D.,
OF PHILADELPHIA.

The Progress of Laryngology and Rhinology.—DR. ST. CLAIR THOMSON, of London (from the Diamond Jubilee Commemoration number of the *British Medical Journal*, June 19, 1897), presents a succinct summary of the progress of laryngology and rhinology in the sixty years of the Victorian age, which is adorned with the reproduction of a signed photograph of

Manuel Garcia, the still living distinguished nonagenarian singing master of London, whose use of the dental mirror, for the purpose of studying the mechanism of voice, gave, in 1854, the initial impulse to laryngology of the present day.

Hard Fibroma of the Maxillary Sinus, with Pyæmia of the Frontal Sinus.—DR. L. J. HAMMOND reports (*Phila. Polyclinic*, August 7, 1897) this interesting case, which is illustrated with instructive wood-cuts. An Irishman, aged thirty-eight years, laborer in a chemical works, suffered violent pain in the left side of his face and forehead, which had resisted all manner of treatment—even the removal of his teeth on the left side of the upper jaw. There was a suppurative discharge from the left nostril and from the site of the second bicuspid tooth. The cartilaginous septum was gone, the loss attributed to the handling of vitriols. The pain was found to be largely due to pressure upon the dental and infra-orbital nerves by a growth in the maxillary sinus. This was removed after access to the parts from the exterior. An additional operation was necessary to trephine and drain the frontal sinus, and an incision was selected over the promontory roof of the nose and continued far enough to allow the flap to expose the inner edge of the superciliary ridge, at which point the sinus was trephined. The treatment gave complete relief, which had been permanent up to the date of the report. The record of this case is exceedingly instructive in its details.

Paralysis of the Larynx in Typhoid Fever.—M. BENOUD (*Lyon Medical*, March 28, 1897; *Boston Medical and Surgical Journal*, April 29, 1897) recently reported to the Lyon Society of Medical Sciences a case of paralysis of the posterior crico-arytenoid muscles occurring in the course of typhoid fever, which came on during the third week of the disease and was followed subsequently by paralysis of the soft palate. It is stated that in a recent monograph by Bouley and Mendel seventeen cases of paralysis in typhoid fever are reported, in six of which the posterior crico-arytenoid muscles were involved.

The Causes of Paralysis of the Recurrents.—M. LERMOYEZ (*Revue Internationale de Rhinologie, Otologie, et Laryngologie*, August, 1897) recently read an admirable and elaborate paper upon this subject before the French Society of Otology, Rhinology, and Laryngology, which we would commend to the careful study of those who have access to the original article, but which is too extensive even for an abstract in these columns.

In concluding his report three principal types of paralysis of the recurrents were presented for discussion:

First, incurable grave paralysis leading to death in consequence of the lesions which have produced it.

Second, incurable benignant paralysis, the cause of which often escapes us, but which is ordinarily simply an infirmity compatible with a prolonged life.

Third, curable and benignant paralysis, in which recovery takes place without any trace of its existence, and which seems to be but the result of a primitive neuritis, of which catching cold is one of the factors.

Laryngectomy.—M. DEPAGE reports (*Revue Internationale de Rhinologie, Otologie, et Laryngologie*, August, 1897) one case of total laryngectomy and one of partial laryngectomy—both successful. In the former the mouth was entirely shut off from the air-passages, and the patient for a while showed great distress for the want of a voice, and insisted upon having the communication between the mouth and the windpipe restored; but little by little he learned to articulate sounds sufficiently satisfactory to make himself understood, and since then has become satisfied with his condition.

Tracheotomy in Emergencies.—In an article on "Ideal Anæsthesia" (*Medical Record*, September 25, 1897), by DR. RAWLINGS NICHOL, of New York, he commends the method proposed by Dr. von Donhoff for performing tracheotomy in an emergency. "A curved needle, threaded, is passed through the trachea; then the tracheal rings are cut, and the thread is caught by a blunt hook; this thread is divided in the middle and the two strings it forms are loosely tied at the back of the neck."

Œsophagotomy and Removal of Dental Plate with Upper Central Incisor Tooth.—This case was reported (*N. Y. Medical Journal*, 1897, No. 981) by DR. A. A. SNYDER, of Washington. The operation was performed under chloroform narcosis with the loss of less than a drachm of blood, and the patient made a good recovery.

Sloughing of the Mucous Membrane of the Œsophagus.—DR. J. C. BROWN, of Smithport (*N. Y. Medical Journal*, 1897, No. 981; *Buffalo Medical Journal*, September), reports a case of corrosive poisoning in a robust man, thirty-two years of age, in which the mucous membrane of the œsophagus and of a part of the stomach was vomited as a complete cast. The œsophageal portion was in perfect shape, with the exception of a few small holes which might have been made in the effort to expel it. The stomach portion was somewhat torn in strips, due perhaps to a more pronounced effect of the corrosive agent. The whole was about sixteen inches in length. The case terminated fatally.

Incomplete Fracture of the Left Cornu of the Thyroid Cartilage, Resulting from Self-Inflicted Violence.—DR. A. DE ROALDES reports (*N. Y. Medical Journal*, 1897, No. 949) a case in which violent manipulation of the larynx in an endeavor to get rid of an olive-seed which had been inspired, resulted in an incomplete fracture of the left cornu of the thyroid cartilage.

(The laryngoscopic picture looks as though it might be a duplicate of a picture made some years ago for one of the compiler's cases in which the projection was attributed to a similar lesion.)

Pharyngeal Teratoma.—DR. A. DE ROALDES reports (*N. Y. Medical Journal*, 1897, No. 949) a remarkable case of fibro-chondroma of branchial origin removed from the throat of an infant six weeks old. It is accompanied by illustrations of the microscopic and macroscopic appearances. The growth was extirpated with a wire snare and forceps, and the child made a satisfactory recovery.

OBSTETRICS.

UNDER THE CHARGE OF

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Cæsarean Section for Contracted Pelves.—OLSHAUSEN contributed a paper upon this subject to the Moscow Congress (*Centralblatt für Gynäkologie*, 1897, No. 38), in which he reported twenty-nine Cæsarean sections performed upon twenty-four mothers for contracted pelves. The greater portion of these were for rhachitis. Twenty-nine children were born living and twenty-six left the hospital living. The children were all much above the average size. Two mothers died, one of sepsis, the other from a towel left in the abdomen by an assistant. Most of these patients had a pulse above 120 for some days, while the temperature ranged from normal to 102°.

His method of performing the operation is as follows: The uterus is turned out of the abdomen and the abdominal wall temporarily closed behind it. The operator palpates the uterus to ascertain the site of the placenta. If he cannot do this he makes an incision at the fundus to avoid the placenta. After extracting the child the placenta is loosened and removed. The inner lining of the uterus is disturbed as little as possible. No elastic tube is placed about the cervix, as Olshausen thinks it exposes the child to danger of asphyxiation. After the uterus is emptied the cervix is compressed by an assistant. To guard against bleeding the patient is given ergotine before the operation. Catgut is the suture material employed.

In view of the success of the modern operation Olshausen thinks it absolutely indicated in many cases, and that its relative indication has a much wider scope. It remains the best method for speedy delivery, as in eclampsia. It is simpler than symphysiotomy and its results are more assured.

In discussion, LEOPOLD had to deal in Saxony with many contracted pelves, and in the last fourteen years had done ninety-three Cæsarean operations, in sixty-seven of which the uterus was retained, while in twenty-six hysterectomy was done. He uses the elastic ligature about the cervix for a few moments only. Ten of his patients had the operation more than once. He diagnosticates the position of the placenta by the distance between the round ligaments. To save the child's life he has operated successfully upon a woman who had a violent gonorrhœa. Although the operation is so successful, the induction of labor is most available for the average practitioner. His mortality rate in ninety-three operations was 8, or 8 $\frac{1}{2}$ per cent.

Symphysiotomy.—In the *Monatsschrift für Geburtshülfe und Gynäkologie*, 1897, Band 6, Heft 3, ZWEIFEL contributes a paper written for the recent International Congress at Moscow. He finds sufficient reason for this paper in the criticisms which have been made upon the operation and in his own success in its employment.

He has had at the clinic at Leipzig thirty-one symphysiotomies; all of the mothers recovered without inconvenience or injury; twenty-seven of the children survived and left the hospital in good condition. Referring to cases reported in which patients could not walk without difficulty, he considers this to be due to excessive stretching of the pelvis and specially to injury of the sacro-iliac joint. He would limit the operation to cases in which the conjugata vera is not less than $6\frac{7}{100}$ cms., and he believes that the best results are obtained when the limit is placed as high as 8 or $8\frac{1}{2}$ cms. He believes that no more danger of hemorrhage exists with symphysiotomy than with Cesarean section, and he has found it quite sufficient to bring the hips of the patient strongly together, to use a tampon of iodoform or sterile gauze in front and behind the symphysis, and to make counter-pressure by tamponing the vagina. To avoid a laceration, he allows the child, whenever possible, to be expelled by the mother's efforts.

He believes that bad results following this operation are caused chiefly by septic infection, and that such occur because the symphysiotomy wound is improperly handled. He insists upon draining this wound and making pressure upon the tissues about the symphysis with gauze and an abdominal bandage. He prefers the open treatment of the symphysiotomy wound, draining it with gauze for eight or ten days until it is filled with granulations. He sews together the symphysis, using two or three sutures which can be absorbed, and usually adding two sutures which are to remain. His exact method of operating consists first in limiting the operation to those cases in which the fetus is not only living, but, by reason of its uninjured condition, is likely to survive. The patient's thighs are allowed to hang down, and a transverse incision is made through the skin about a finger's breadth above the symphysis. Superficial vessels are tied. The fasciæ over the symphysis and linea alba are separated from their attachments to the bone, and the tissues are loosened from the lower edge of the subpubic ligament. A silver catheter is then placed in the urethra, the finger of the left hand passed behind the symphysis, pushing aside the bladder, and the joint is opened with a probe-pointed knife from above and forward until all fascia and ligaments are separated. He uses a strong knife whose back is not too thick to go readily between the bones. The hanging posture of the legs helps to draw asunder the bones when the cut is made. The symphysiotomy wound is packed with sterile gauze, moderate pressure is made upon the iliac bones, and the patient is delivered, if possible, spontaneously. If slight delay occurs, a broad band of flannel or rubber is placed across the pelvis, and the head made to descend by pressure. He finds oftentimes that bleeding occurs when the head emerges, while not infrequently the head lodges obliquely upon the pelvic floor and must be delivered by forceps. The pubic bones are then brought together by two stitches of catgut and two of non-absorbable material, a catheter is placed in the bladder, and the symphysiotomy wound packed with gauze. The stitches are brought together through the greater part of its extent. The gauze remains eight or ten days, is gradually shortened, and, if silver sutures have been used, they are removed when the granulations approach the surface. An ample antiseptic dressing and occlusion-bandage are kept over the wound.

In three of his cases injury occurred to the urethra or bladder; once by a

catheter, once when the urethra was caught between the pubic bones by the removal of the gauze, and once when a pair of tenaculum forceps injured the urethra. In none of these cases was the complication a serious one. Zweifel has found the pelvis appreciably enlarged after symphysiotomy. He believes that such a pelvis will permit spontaneous birth more readily than before symphysiotomy.

In the *Centralblatt für Gynäkologie*, No. 38, 1897, VARNIER also contributed a paper upon this subject, in which he arrived at the following conclusions: An enlargement in the pelvic diameters gained by symphysiotomy reduces infant mortality so greatly that the death-rate of children born after symphysiotomy in contracted pelvis is the same as the death-rate of children born by instrumental labor of mothers who have normal pelvises. Hemorrhage and injury play a very unimportant part. If infection does not occur symphysiotomy is no more dangerous from these causes than is any other instrumental delivery. Wounds to the bladder and urethra after symphysiotomy are generally caused by the use of forceps, and fatal cases result from septic infection which has its origin from the uterus or bladder or urethra. Complete recovery follows symphysiotomy. The operation may be repeated without injury to the patient. It does not, however, permanently enlarge the pelvis, as some assert. The operation should be made only in those cases in which the child is vigorous, the os and cervix completely open, and the membranes ruptured. It should never be made in a pelvis whose true conjugate is less than 7 cms. It is also indicated where the child is abnormally large and the pelvis normal. It should take the place of induced labor, violent efforts with forceps, and version and embryotomy on the living child. Varnier denies the value of Walcher's position in enlarging the pelvis. Symphysiotomy is indicated in symmetrical pelvises where pelvic tumors are not present. It is not indicated in cases where the child is dying from neglect or pressure. In cases already infected, symphysiotomy need not be declined if care is taken that the symphysiotomy wound in no way connects with the infected genital canal.

The Injuries of Parturition, the Old and the New.—At the recent meeting of the British Medical Association at Montreal, the President's Address to the Section on Obstetrics and Gynecology was given by SINCLAIR, of Manchester (*British Medical Journal*, 1897, No. 1914). The text of his paper was the case of a young primipara, whom he saw in consultation, suffering from septic infection, with lacerations of the vagina caused by the use of forceps. The trend of his paper is to show that the use of antiseptics and anesthetics has made physicians careless, leading them to resort to the use of forceps hastily and in cases which would terminate naturally if left alone.

He supports this statement by statistics from English physicians, which virtually amount to a statement that nearly 75 per cent. of the labor cases in manufacturing towns are terminated by forceps. He also alludes to the remarkable statement from the Rotunda Hospital that after forceps application women die from fretting. Sinclair then proceeds to show that at the Manchester Maternity about 9 per cent. of cases in the house are terminated by forceps without maternal mortality. In out-patient practice in the same clinic the forceps was applied in 1.4 per cent. He adds a list of statistics

from the maternities of the Continent, showing that the use of forceps varies from 1.4 to 22.6 per cent. of cases, the highest average being found at Munich in Winckel's clinic. He urges very strongly a strict limitation in the use of forceps. He thinks it improper to trust simply to mercurial solutions to secure antisepsis. He recognizes the value of closing lacerations, but in his observations such closure has not been very successful.

[We are not deeply impressed with the excellence of obstetric practice in the hands of the average English physician, if these statements are correct. It is unfortunately true, as experience has shown in the case of some, that a large obstetric practice can be built up by giving anodynes freely until the os is nearly dilated, and then by delivering the patient with forceps. Ensuing lacerations were closed when severe, and otherwise were left to heal by granulation. Such practice, however, is not that of the best obstetricians at the present day. Among neurotic and ill-developed women, whether those enfeebled by luxury or by hard work and little food, the forceps must often be used. Many of these cases are delivered by the use of Barnes's elastic dilators, assisting uterine contractions by stimulants and by manipulating the uterus without the use of instruments. In others, the timely use of forceps prevents uterine relaxation and hemorrhage, prevents exhaustion, and brings much speedier convalescence than delay in labor. It is, however, the practice of the best obstetricians in the United States to immediately close serious tears of the cervix, pelvic floor, and perineum, and under antiseptic precautions satisfactory union occurs in a great majority of cases. Septic infection is rare among patients in our best hospitals and equally rare in the practice of our best men in private houses. Dr. Sinclair's comments upon the use of forceps remind us that, if we mistake not, a member of the royal family of England was once allowed to die in childbirth because of an inexplicable reluctance to apply forceps.]

Dr. Sinclair urges, however, an improvement in obstetric instruction so that the student shall receive the same teaching that is now given in surgery and medicine. The need of improvement in this direction in America is quite as great as in England.]

GYNECOLOGY.

UNDER THE CHARGE OF

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OF NEW YORK.

Intermittent Cysts of the Ovary and Kidney.—WILSON (*Birmingham Medical Review*, August, 1897) points out the fact that the disappearance of an abdominal cyst following the passage of large quantities of urine, usually regarded as pathognomonic of intermittent hydronephrosis, may also occur in connection with ovarian cysts. The following interesting case is cited: A multipara entered the hospital with a tumor of six years' standing, diagnos-

ticated as a monolocular ovarian cyst. She stated that on several occasions the tumor had completely disappeared, while at the same time she had marked polyuria. On opening the abdomen a thin-walled cyst was found, containing colorless fluid and universally adherent to the abdominal parietes. In three places in the cyst-wall were cicatrices marking the sites of probable ruptures. The difficulty of distinguishing between such cysts and hydronephrosis is greatest when the tumor fills the abdominal cavity. The relation of the large intestine to the cyst is most important, since it is only exceptionally that it lies in front of one of ovarian origin. If the gut is collapsed it may be distended by injections of effervescing salts. Vaginal examination will often throw light on the diagnosis; also catheterization of the ureter.

The writer advises closure of the abdominal incision and drainage through a lumbar opening when an obscure cyst is found to be renal.

Action of the Bacterium Coli Commune on the Endometrium.—MORISANI (*Archiv. di Ostetricia*, March, 1897) injected cultures of this bacterium into the normal uterine cavity with negative results. He then irritated the endometrium by different agents (probes, hot water, nitrate of silver, etc.) and repeated the injections. Death followed from septic endometritis and peritonitis in periods varying from fourteen to seventy-two hours. It is not clear what protects the healthy mucosa against the action of the micro-organisms, but it may be inferred that either the normal secretion inhibits them, or that there may be some phagocytic action. When the mucosa was irritated both a local and a general infection speedily followed.

Cultures were injected into the rectum with a fatal result in all cases. In animals with a healthy endometrium the latter showed no evidences of inflammation, but when the mucosa had been previously irritated, septic endometritis developed as before.

Appendicitis in the Female.—RICHELOT (*La Gynécologie*, June, 1897) emphasizes the difficulty of diagnosing appendicitis in the female. He reports six cases in which it was impossible to decide positively before opening the abdomen. In the absence of a clear history and early observation of the case it is still more difficult to make an exact diagnosis. The presence of pain and a tumor in the region of the right tube and ovary, situated high up (the left being normal), should always awaken the suspicion of possible appendical trouble. On the other hand, an inflamed appendix may be adherent in the cul-de-sac. In the absence of any swelling, the pains complained of by certain neurotic females may simulate those of appendical origin. If the hymen be intact it is fair to infer that an inflammatory enlargement on the right side is due to appendicitis rather than to disease of the adnexa.

Appendicitis and Parametritis.—TREUBE (*Revue Gynécologie et de Chir. Abdom.*, No. 2, 1897) reports cases in which he operated for appendicitis and found that the true condition was disease of the adnexa, and *vice versa*. The relation of appendicitis to parametritis is of considerable interest. The writer believes that the relatively greater immunity of the female from appendicular inflammation is due to the close anatomical relation of the

meso-appendix to the right broad ligament. In the milder grades of post-puerperal infection, which do not reach the suppurative stage, the process is frequently ushered in with pains in the ileo-cæcal region, attended with vomiting and rise of temperature. A swelling may develop and rapidly disappear without further disturbance.

Experimental Appendicitis.—BEAUSSENAT (*Revue de Gynécologie, et de Chir. Abdom.*, No. 2, 1897) presents the results of his experiments upon rabbits, which are as follows: 1. Appendicitis is always the result of infection; 2. This infection may be transmitted through the blood- or lymph-vessels; 3. There are no pathogenic organisms, though the most common etiological factor is the bacterium coli; 4. In order that these bacteria may become active it is necessary either that the vitality of the normal mucosa should be impaired or that phagocytic action should be diminished; 5. In every case of experimental appendicitis the accompanying infectious folliculitis spreads to the surrounding lymph-channels, and adenitis is the constant rule; 6. The predisposing factors cause the initial lesion, or favor the infection, by diminishing the power of resistance; 7. Entero-colitis is the chief predisposing cause, as proved by experiment, as well as by clinical observations; 8. Concretions in the appendix are the effect of the appendicitis, *not* the cause; 9. A foreign body may act as a predisposing cause, through the resulting traumatism.

Hæmatoma of the Vulva.—BINDER (*Centralblatt für Gynäkologie*, No. 34, 1897) reports the following interesting case of hæmatoma in a non-pregnant woman, not due to traumatism: An alcoholic subject, aged thirty-nine years, on lifting a tub of water from a chair to the floor, was suddenly seized with a sharp pain in the perineum, accompanied by a desire to have a movement of the bowels. In spite of violent straining she could pass nothing, and only increased the pain. On examination the right labium was found to be enlarged and tender to the touch. Between the anus and right tuber ischii was a tense tumor the size of an egg, quite sensitive. An ice-bag was applied to the external genitals. Three hours later the right labium had swollen to the size of the fist, and the vagina was almost filled by a bluish-red tumor springing from the right side, while the enlargement in the anal region had assumed a quadrilateral shape and was connected with the labial swelling. The symptoms were less severe than at first. The blood-effusion was entirely absorbed in the course of two weeks.

The writer attributes the accident to the effect of a sudden muscular effort upon vessel-walls weakened by excessive indulgence in alcohol.

Absorptive Power of the Vaginal Mucous Membrane.—LEUBUSCHER and MEUSER (*Zeitschrift für Praktische Aerzte*, 1897, Heft 2), as the result of a series of experiments with solutions of iodide of potassium introduced into the healthy vagina, found that when used in suppositories the urine showed the characteristic reaction within from two to three hours, though faintly. In an aqueous or glycerin solution the drug was absorbed more quickly and a larger amount was excreted. As compared with that of the

rectal the observers found that the absorptive power of the vaginal mucosa was quite feeble.

A caution is added against the indiscriminate use of large doses of the more powerful drugs per vaginam, especially in glycerin solutions, since the latter fluid may cause such a change in the surface epithelium that the absorptive power of the mucous membrane is greatly increased.

Intestinal Paralysis after Abdominal Operations.—ENGSTRÖM (*Zeitschrift für Geb. und Gynäkologie*, Band xxxvi, Heft 3) believes that while sepsis is the principal cause of post-operative intestinal paralysis, it may be due to other factors, such as mechanical or chemical irritation. The excessive use of saline purgatives previous to operation is to be mentioned as a possible cause. Psychological causes, especially excessive nervousness, are to be borne in mind.

Diphtheritic Venereal Ulcer of the Cervix Uteri.—RASCH (*Archiv für Dermatologie*, Band xxxix, Heft 1) calls attention to a specific lesion of the cervix described by Bernutz as "diphtheritic chancre," but subsequently unrecognized by most gynecologists. He describes three cases in which such ulcers were observed at the edge of the os externum. The multiple papules were slightly raised, with a grayish-yellow, finely granular surface, and bled easily. Inoculations on the thighs gave typical chancreoids. They healed quickly under iodoform. The diagnosis was aided by the presence of chancreoids on the external genitals.

The writer believes that these cervical ulcers developed on existing erosion of the os externum. Their yellow color distinguishes them from the grayish bases of true chancres.

Fetid Endometritis in Elderly Women.—MAN-ANGE (*Arch. de Tocol. et d'Obstet.; Contributions für Gynäkologie*, No. 21, 1897) called attention to the importance of making a correct differential diagnosis in these cases. This form of endometritis is accompanied by a purulent, rarely bloody, discharge from the uterus, which always has an extremely offensive odor. The patient complains of anorexia, vomiting, and pain in the stomach, and becomes rapidly emaciated until her condition is similar to that of a victim of carcinoma. On examination the vaginal mucosa is seen to be intensely congested in consequence of contact with the irritating secretion. The cervix uteri presents a normal appearance, the corpus being somewhat enlarged. Pain is experienced on passing the sound, and an escape of pus with offensive odor is noted on withdrawing the instrument.

It is impossible to distinguish this condition from carcinoma of the corpus uteri except by careful palpation of the interior of the organ and the removal of tissue for microscopical examination. In the benign condition this shows the ordinary changes characteristic of chronic endometritis, glandular hypertrophy, hyperplasia of the connective tissue, and round-cell infiltration.

The prognosis of fetid endometritis is favorable, though recurrence may occur after curettement. The cervix should always be thoroughly dilated with tents before operation, after which the uterus is to be tamponed with iodoform gauze saturated with a 30 per cent. solution of carbolic acid in glycerin.

PÆDIATRICS.

 UNDER THE CHARGE OF

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ASSISTED BY

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Cerebro-spinal Meningitis due to the Meningococcus.—STOELZNER (*Berliner klinische Wochenschrift*, 1897, No. 16, S. 333) reports a case of epidemic cerebro-spinal meningitis in a girl, aged two and one-half years, terminating in recovery at the end of thirty-four days. The interest of the observation lies in the fact that lumbar puncture was made and that the cerebro-spinal fluid gave a pure culture of the intracellular meningococcus (Weichselbaum-Jaeger), which, according to the researches of Heubner, should be considered the specific cause of epidemic cerebro-spinal meningitis.

Purulent Arthritis in the Course of Epidemic Cerebro-spinal Meningitis.—FRONZ (*Wiener klinische Wochenschrift*, 1897, No. 15) reports the case of a boy, aged two and one-half years, admitted to the hospital with all the symptoms of a cerebro-spinal meningitis and an arthritis of the right ankle-joint, which had begun three days after the onset of the meningitis. Lumbar puncture gave issue to a turbid fluid, containing, besides numerous leucocytes, a great number of intracellular meningococci, which proved to be extremely virulent for mice, but less so for guinea-pigs.

Pus removed from the articulation also contained meningococci, which failed to grow. Cultures of the blood also remained sterile.

The child died about fifteen days after entrance. Two days before death he presented successively arthritis of the elbow and thumb of the left side and of the shoulder, elbow, and wrist of the right. The streptococcus alone was found in the exudate. At the autopsy the lesions of cerebro-spinal meningitis were found. The ankle-joint, which had contained meningococci in its exudate, was nearly well. The other articulations, which had been affected shortly before death and showed the presence of streptococci, were filled with pus.

According to the author, the arthritis of the ankle, which had existed from the early period of the disease, had been produced by the specific agent of the meningitis; while the other joint involvements were due to a secondary infection with the streptococcus. This observation shows that the meningococcus may penetrate the articulation and provoke the formation of an exudate; that this form of joint inflammation, like the meningitis due to the same cause, has a tendency to cure, which is absent in an arthritis due to streptococci or staphylococci.

The Use and Limitations of Condensed Milk in Infant Feeding.—KERLEY (*Medical News*, 1897, vol. lxx, No. 23) gives an admirable study of this sub-

ject. The analysis of a condensed-milk mixture, he finds, when diluted for use in the proportion of one part in six of water, gives 1 per cent. of fat, 1.2 per cent. of proteids, and 8 per cent. of sugar, a greater part of which is cane-sugar. It is extremely rare, however, to find a child who can take so rich a mixture without producing colic and indigestion. Most cases receive a 1 to 12 or 1 to 14 mixture. The 1 to 12 dilution gives a mixture containing 0.5 per cent. of fat, 0.6 per cent. proteids, and 4 per cent. sugar—a very inadequate combination. Apparent as the shortcomings are, many children will do comparatively well in early life on the weaker dilutions. There is sufficient carbohydrate to produce heat, and the proteids, though small in quantity, furnish the requisite amount of nitrogen. Many thrive on the 1 to 12 till the third month, then the demand for the system exceeds the supply of fat and proteids. If the diet is continued, rickets and malnutrition of varying degree will almost always follow.

Of the many hundred marasmic and rhachitic infants observed, the author believes that full 95 per cent. had been fed on the meal foods or on condensed milk, chiefly the latter. A few cases are met which have been fed exclusively on condensed milk up to the ninth or tenth month, and have thriven fairly well; they usually present some evidences of bone rickets.

Notwithstanding its many disadvantages, the author is compelled to give it to many children every year, chiefly among the poor, the ignorant, and the careless. It is now his effort to make up to such babies the deficiency of fats and proteids. Cream may be added in proportion to make up the deficient fat. Among dispensary patients cod-liver oil supplies the deficiency, the dose varying with the age of the baby, the ability to digest it, and the season of the year. Ten drops to a dessertspoonful, three or four times daily after feeding, are usually prescribed. During very hot weather the dose must be reduced or suspended if there are evidences of gastro-intestinal disturbance.

The low proportion of proteids may be increased by adding a meat-broth. One pound of lean beef is boiled in one quart of water till the liquid is reduced to one pint. Such a broth, according to analysis of J. S. Adriance, contains 0.8 per cent. proteids; so that if one part of condensed milk is added to twelve of broth the mixture will contain 0.5 per cent. fat, 1.4 per cent. proteids, and 4 per cent. sugar. This will answer for a child three months old, fat being supplied by cod-liver oil. When the sixth month is reached one part of condensed milk may be added to nine of broth. The percentages then will be, approximately, 0.75 per cent. of fat, 1.7 per cent. proteids, and 5 per cent. sugar. This, with cod-liver oil, will answer until the eighth or ninth month, when the critical nursing period will have been passed, and barley and oatmeal gruel, with other meal mixtures, may be allowed.

The Absorption of Milk-fats in Children—KNOEFFELMACHER (*Wiener Klinische Wochenschrift*, 1897, No. 30, S. 695) studied the conditions of absorption of food-fats in the intestinal canal with especial reference to the milk-fats in the diet of young children. His conclusions are: 1. That the fat in the feces of adults and children upon an exclusive milk-diet contains 12 to 20 per cent. olein, the greater part of which belongs to the fat discharged

with the digestive juices, a smaller proportion to unabsorbed milk-fat. 2. That the fat in the stools of nurslings contains 28.8 to 37.8 per cent. of olein. Only a very slight proportion of this, about 5 per cent., corresponds to the partly digested fat, the rest of the olein of the feces-fat coming from the unabsorbed milk-fat. 3. That in the nursling the appropriation of milk-fat is somewhat less active than in older children and adults.

Researches Upon the Pathogenesis of Rhachitis.—SMANIOTTO ETTORE (*Revue Mensuelle des Maladies de l'Enfance*, March and April, 1897) has made careful study of the epiphyses of rhachitic and non-rhachitic bones of young children. Out of 25 observations of non-rhachitic bones of children dead of various infectious diseases, the cultures remained sterile in 16; six times pure cultures of streptococci were found, twice the bacterium coli commune, and once some rare colonies of the staphylococcus pyogenes albus. From these results the author concluded that in a septicæmia in the child microbes readily invaded the bones, and in the long bones it is especially the epiphyses that are affected; that in the child the bacterium coli commune and other bacteria of the intestine do not invade the bones within the first thirty to thirty-five hours after death, or, at least, this is extremely rare.

In the second place, 22 observations upon distinctly rhachitic bones were made. A *résumé* of these observations presents the following conclusions: With children who have suffered from a grave chronic gastro-enteritis there can be found in the epiphyses of rhachitic bones a great number of bacteria; these are especially the bacteria of the intestine, the colon bacillus with its varieties being the most constant. Next comes a peculiar bacillus found by the author in rhachitic alterations of grave degree; then the streptococcus, the bacillus pyocyaneus, the staphylococcus, and several other cocci. There is always an association of bacteria. In rhachitis of moderate gravity always due to a chronic gastro-enteritis, the number of bacteria which have invaded the epiphyses is small and the varieties not numerous.

In children dead of chronic lesions of the organs of respiration, and exhibiting symptoms of mild rhachitis, the streptococcus was found four times, and in one case of purulent pleurisy due to the pneumococcus, this bacterium was found.

In all cases in which the rhachitic lesions were grave, and where the diaphysis of the ribs was also affected, this portion of the bone always showed discrete colonies of the same bacteria as were found in greater profusion in the epiphysis. In cases of slight rhachitis, however, where the lesions were appreciable at the epiphyses, but very little or not at all distinguishable in the diaphyses, cultures from the latter portion of the bones showed only rare colonies or remained sterile.

The author believes it is scarcely possible to interpret these facts by assuming an invasion of the bones during the death agony or after death by intestinal bacteria. He believes his deductions are correct from the results of his examinations of non-rhachitic bones, from the presence in rhachitic bones of these bacteria just where the characteristic lesions of rhachitis are found, and especially from a personal observation in one of his cases, where a rhachitic bone was punctured during life and blood withdrawn from it

showed the presence of the bacillus pyocyaneus, streptococci, and a peculiar coccus. These facts are strongly opposed to the view of a possible agonal invasion.

The observations in this interesting study, while not sufficiently numerous to permit of positive conclusions that rickets is always of infectious origin, seem strongly to indicate that bacteria play a preponderant rôle in the pathogenesis of this affection. It appears to be due, most frequently, to a localization in the bones of all the infections or auto-infections by which children badly nourished and badly cared for are frequently attacked in the early months of life, especially if they are congenitally weak.

Bacteriuria as a Cause of Diurnal Enuresis.—LYDER NICOLAYSEN (*Deutsche medicinische Wochenschrift*, March 25, 1897, S. 195) calls attention to what seems to be a frequent cause of diurnal incontinence of urine in children. Out of 5000 patients with incontinence only eight were found who presented the phenomena of incontinence by day but without disturbance during sleep. In four of these cases, more carefully examined than the preceding four, pure cultures of the colon bacillus were found. In only one of these was there slight pain in micturating. The condition is readily detected by stained cover-glass preparations of the freshly passed urine and by culture-tests. This condition has been especially described by Krogus (*Annales des Maladies des Organes génito-urinaires*, xii. p. 196), who reported eight cases, one of which came to section and showed evidences of beginning interstitial nephritis, but macroscopically (?), no evidences of disease of bladder or pelvis of the kidney. The author is disposed to attach considerable etiological importance to the fact that bacteriuria existed in four of his eight cases of diurnal incontinence, though Roosing (*Krankheiten der Nieren und Ureteren*, Copenhagen, 1895) has suggested that a small renal concretion may be present in the pelvis of the kidney in these cases. In two cases of undoubted nephrolithiasis recorded by this writer bacteriuria also existed. No evidences of renal disease were to be found in any of Nicolaysen's cases.

In the author's hands treatment has been rather unsatisfactory. Only two of the cases could be properly followed up, and while improvement in the incontinence followed repeated lavage with solutions of silver nitrate, the urine continued to show the presence of a certain number of bacteria.

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THE INFLUENCE OF COW'S MILK IN THE SPREAD OF
DIPHTHERIA;

WITH AN ACCOUNT OF A MILK EPIDEMIC OF DIPHTHERIA.

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THE general use of milk as an article of food, especially by the younger and least resistant portion of mankind, very much increases the importance of the question of its acting as a medium for the transmission of the germs of infectious diseases, and in the past decade much of interest has been added to our knowledge upon this subject. There is conclusive evidence that tuberculosis, typhoid fever, and cholera are not infrequently spread by means of milk. Other diseases, for which there is more or less strong evidence in this regard, are diphtheria, scarlet fever, erysipelas, measles, anthrax, and pleuro-pneumonia, and hydrophobia in cattle. (Peterson.¹⁴)

Taylor,²¹ in England, reported in 1870 an epidemic of scarlet fever which he thought was spread by milk. Here the first case was the child of a dairyman whose wife nursed the child and milked the cows. Since then Power, Klein, Cameron, Bostack, Hill, and others have studied extensive milk epidemics of scarlet fever.

Outside of England the only epidemic of scarlet fever has been traced to milk. (Johanessen.⁷)

Esherich³ calls attention to the fact that outside of England no milk epidemics of diphtheria have been reported.

Flügge,⁴ in his recent exhaustive article on the epidemiology of diphtheria, concludes that diphtheria is never transmitted by means of food-stuffs, such as milk and meat.

The first published observation on the relation between milk and the spread of diphtheria was that of Power¹⁶ in 1879. Power studied exhaustively an epidemic of diphtheria in the north of London, where, in an area one and a half miles in diameter, there occurred in the fifteen weeks between March 2d and June 15th, 264 cases of diphtheria in 116 households. Of these, 78 households showed their first attacks during the four weeks ending May 25th. The cases were most numerous in the central portion of the infected area, where in four weeks there occurred 175 cases in 70 households. Careful study of the water-supply and of the sewerage failed to explain the sudden outbreak.

Early in the epidemic Dr. Norton noticed that a large proportion of the infected houses had the same milk-supply, and further study of this showed that one man owned two dairies, one at Kilburn and one at Muswell Hill, some distance away. The milk from these two dairies was not mixed, though the cows were sometimes interchanged.

At the time of the epidemic the Kilburn dairy supplied daily 80 gallons, of which a constant supply was furnished A., of Kilburn (49 gallons), and B., of St. John's Wood (24 gallons). A. obtained the whole of his milk-supply from this dairy, but B. obtained a portion of his from other sources.

The milk dealer, X., also sold a variable quantity of milk to other retail dealers, two in Kilburn, five in Portland Tower, and one near Dorset Square. The milk from X.'s other dairy was sold daily by retail dealers. A study of the households in the most highly infected area showed that one-fifth of them obtained their milk from A. and B., dealers in X.'s milk. The incidence of diphtheria in households supplied with milk to the middle of June, when the epidemic ceased, showed: Of 236 households supplied by A., 37 invaded, or 15.6 per cent.; of 237 households supplied by B., 31 invaded, or 13 per cent. Average, 14.3 per cent. Of 2227 households supplied by other milkmen, 30 invaded, or 1.3 per cent., showing a difference of incidence in the proportion of 11 to 1 between the two sets of customers.

In the outer circle the incidence of throat illness between households supplied by A. and B. and those supplied by other milkmen was 12 to 1. The milk could not be credited with all the mischief, as there were cases of diphtheria in the neighborhood before, during, and after the severe outbreak, which were in no way connected with the milk-supply.

The nine gallons of X.'s milk sold in Muswell Hill were mixed with milk from other sources, but cases of diphtheria could be traced along its distribution. Power was not able to trace the contamination of the milk to a case of human diphtheria, careful inquiry failing to show any case from which the milk could have been infected.

The occurrence of the disease was especially well marked among children. Out of 233 cases whose ages were inquired into there were in

from 0 to 1 year 2 cases, or 0.8 per cent.; from 1 to 3 years, 21 cases, or 9 per cent.; from 3 to 12 years, 124 cases, or 53 per cent.; from 12 to 20 years, 31 cases, or 13 per cent.; over 20 years, 55 cases, or 23 per cent. So those using most milk were proportionately most severely affected.

Power,¹⁸ in 1886, studied another epidemic of diphtheria apparently due to infected milk. During October, 1886, there was a sudden outbreak of diphtheria in York Town and Camberly, a country district with scattered houses, inhabited by well-to-do people, military, tradespeople, and cottagers numbering in all about three thousand persons. Though diphtheria had prevailed for some years in parts of the same parish, this district had remained free. On October 13th more than a dozen cases were reported, and by the 24th there were seventy cases with thirteen deaths.

Early in the epidemic it was noticed that the infected houses received milk almost exclusively from one dairy. The cases were widely scattered and no other common source of infection could be discovered. Power made inquiries into the milk-supply of all the infected houses and into 82 non-infected houses. Of the 176 households studied, 57 were infected with diphtheria, 88 cases; and in addition to these there were 5 cases of scarlet fever and 47 cases of more or less grave throat illness. There were 16 deaths. Of the 57 houses and 147 people attacked (including cases of scarlet fever and the cases of throat illness not classed as diphtheria) 90 per cent. were affected between the 8th and the 18th of the month. Of the 176 houses 94 took the suspected milk. All the milk-receiving houses were in the infected district. The 82 non-milk-receiving houses studied by no means included all the houses not receiving milk. The 94 milk-receiving households had in October 48 houses with diphtheria, with 81 cases and 15 deaths. During the same period 9 of the 82 non-milk-receiving houses were infected, 6 cases reckoned as true diphtheria and 10 as minor throat illness, diphtheria or not, with only one death. So of the 176 households studied, 57 were attacked in October and 48 (84.2 per cent.) received milk from the suspected dairy—all becoming infected in ten days. Of the 140 persons with throat illness 124 (88.5 per cent.) were members of families using this milk, and 93.5 per cent. were attacked between the 8th and the 17th of October.

The milk consumers could be divided nearly equally into two distinct classes: (1) the better class; and (2) the cottagers and tradesfolk, who suffered very differently. Of 44 families of the first class 37, or 84 per cent., were invaded; of the 50 families of the second class 11, or 22 per cent., were invaded. Of 317 individuals of the first class 105, or 31 per cent., were attacked, 29 per cent. of the adults exposed being attacked and 54.1 per cent. of the children. Of 239 individuals of the second class only 6.3 per cent. were attacked.

Both classes received the same milk, the whole of the milk yield being thoroughly mixed before distribution. No skimmed milk was sold. The poorer class took less milk and used their milk at once after its receipt, usually in hot tea or coffee; while the richer class took larger quantities and often let the milk stand. Children in the poorer families received little milk, while in the well-to-do families they lived largely upon it, and many were large milk-drinkers.

Cream was not a factor in the spread of the disease, while skimmed milk was. In 11 houses where this was used (the milk standing some time to let the cream rise) there was a great incidence of diphtheria, both in children and in adults, heavier than in any other group of households of similar size. The amount of milk taken seemed to bear an important relation to the incidence of the disease and the severity of the attacks. Out of 217 adults, not special milk drinkers, in 41 households 27.6 per cent. were attacked; while of 32 adults in 21 households, where considerable quantities of milk were consumed, 78 per cent. were attacked. Of 10 children in 8 households reported as not taking milk only one was attacked, while of 33 other children taking largely of milk 70 per cent. had diphtheria. The disease was fatal for more than one-third of the children partaking largely of milk. Power was not able to trace the infection of the milk to a case of human diphtheria. He concluded that the milk was infected before leaving the farm, but it could not be discovered how.

The cows were examined and pronounced healthy October 13th. About November 1st one of the cows had "chapped teats."

Power,¹⁹ in 1887, studied another severe outbreak of diphtheria apparently spread by milk. At Eading there was a sudden outbreak of diphtheria lasting seven days among the customers of a certain dairy, who suffered twenty times more severely than others not using this milk. All of the deaths occurred among persons using the suspected milk. No satisfactory explanation for the infection of the milk was found.

Clark² has reported an epidemic of diphtheria occurring at Melrose and Malden in June, July, and August, 1886, which he thought was directly traceable to the milk-supply, and 13 out of 16 infected foci receiving the suspected milk.

Mason¹³ attributed the outbreak of diphtheria in Barking in 1888 to the milk of a particular dairy. Klein found an eruption on the teats of some of the cows of this dairy.

In 1890 Philpot¹¹ investigated an epidemic of diphtheria at Croyden. The outbreak was distributed along a particular milk-route. Of 541 houses receiving the suspected milk 65, or 12 per cent., had cases of diphtheria, while of the 1600 other houses 32, or 2 per cent., were infected.

The infection of the milk-supply could not be traced to a case of human diphtheria. The teats of some of the cows of the suspected dairy showed sores.

In American literature there are two instances in which spread of diphtheria has been attributed to milk. The first report is that of Goodwin,¹⁶ of Assapolis, Mich., where a Mrs. D. had a severe attack of diphtheria. In each of two families in the same block receiving milk from Mrs. D.'s cows there appeared a case of diphtheria. Although there was no other mode of transmission of the virus found, this appears to be only a coincidence, and one would hesitate, without further evidence, to class this as milk infection.

W. H. Stillman,²⁰ of Kalamazoo, Mich., reports six cases of diphtheria occurring in two families using the same milk. In one family the mother and four children, and in the other, one adult had the disease. All the children and one adult used the milk freely. The cows seemed perfectly healthy.

On December 13, 1894, the writer was invited by Dr. W. T. Miller, of the Ohio State Board of Health, to accompany him to Ashtabula, Ohio, to study a sudden outbreak of diphtheria.

Ashtabula, a town of about twelve thousand inhabitants, situated on Lake Erie, is divided into two parts, the harbor and the town proper. The harbor is a large ore port, with a population of mixed nationalities numbering about three thousand persons, and lies directly upon the lake front. Many of the houses are small, crowded, and ill ventilated. The people are intimately associated through their work, churches, and the schools, and constantly neglect the rules of the sanitary authorities. Diphtheria, scarlatina, and typhoid fever are usually endemic there.

The drainage is mostly surface, and the water-supply is derived from the lake and from wells.

The harbor consists of the First and the Sixth Wards, and is separated from the town proper by the valley of the Ashtabula River.

The town proper, having about nine thousand people, is situated on rolling ground about two miles inland and on a somewhat higher plane than the harbor. It is divided into the Second, Third, Fourth, and Fifth Wards. The streets are wide, the houses well built, and often surrounded by large lots. The people in general are very well-to-do. The drainage is mostly surface, and a large part of it goes into the river. The water-supply is derived from the lake and from wells.

A large portion of the Second Ward is not built up, and the houses are few and widely scattered.

The bulk of the population live in the Third, Fourth, and Fifth Wards, and here the principal business and residence streets are situated.

At the harbor there were reported in the eleven months from January

1, 1894, to December 1, 1894, 87 cases of diphtheria, of which 57 were in the First and 30 were in the Sixth Ward. During the same period only 18 cases were reported in the town proper, 2 in the Second, 4 in the Third, 11 in the Fourth, and 1 in the Fifth Ward. A study of the occurrence of diphtheria by months during this period shows for January, 11; February, 24; March, 17; April, 5; May, 7; June, 3; July 2; August, 2; September, 2; October, 15; November, 17 cases.

For the spread of the disease at the harbor during this period there does not appear to be any special mode, and careful study fails to show any common source of infection beyond the habits of the people, which afford abundant explanation. The Local Health Officer has not been able in three years to trace any special relation between different houses and the occurrence of diphtheria at the harbor.

The population there is largely a floating one, and many of the resident families take in as boarders during the spring and summer months numbers of transient workmen. These people are not especially attacked by the acute infectious diseases, and during their stay diphtheria is at its lowest. Diphtheria is kept spreading among the permanent residents by their free intercourse and careless habits.

On December 5, 1894, there was a sudden outbreak of diphtheria in the town proper, where there had been no cases for some time. Between the 5th and the 13th there were reported 67 cases of diphtheria occurring in 49 houses. On the 6th there were 5 cases; on the 7th, 8 cases; on the 8th, 10 cases; on the 9th, 6 cases; on the 10th, 14 cases; on the 11th, 5 cases; on the 12th, 8 cases; and on the 13th, 7 cases. After this there was a marked decrease in the number of new cases. On the 14th there were 3 cases; on the 15th, 2 cases; on the 16th, 1 case; on the 17th, 4 cases; on the 18th, 5 cases; on the 19th, 2 cases; on the 20th, 2 cases; on the 21st, 3 cases; on the 22d no case; on the 23d, 2 cases; on the 24th no case; on the 25th, 1 case; on the 26th, 2 cases; on the 27th, 1 case; on the 28th and 29th no case; on the 30th, 3 cases; on the 31st, 2 cases; a total for the eighteen days of 33 cases.

It is probable that during the first few days of the outbreak there were a number of cases which did not come under the care of physicians and were not reported. Two such cases came later to my notice. They were both mothers who had what they called "canerous sore-throat," and in each case I demonstrated the diphtheria bacillus in cultures made from their throats two weeks after recovery.

Diphtheria afterward broke out in the family of each.

Some of the cases reported on the 6th really occurred on the 4th and 5th.

The accompanying table gives the distribution of the cases reported between December 6th and 13th by wards:

			Wards.						Number of houses.
			First.	Second.	Third.	Fourth.	Fifth.	Sixth.	
December 6	.	5	0	0	0	3	1	1	5
" 7	.	8	0	0	1	5	1	0	7
" 8	.	10	0	1	1	7	0	0	9
" 9	.	6	0	1	0	3	1	0	5
" 10	.	15	0	2	1	4	0	0	7
" 11	.	5	0	0	4	0	0	0	1
" 12	.	8	0	2	3	1	0	0	6
" 13	.	7	0	2	0	1	0	3	6
Total	.	64	0	8	10	24	3	4	49

So in nine days there was an incidence of 64 cases of diphtheria in 49 houses. All these houses were, as a rule, widely separated, and all but four (Sixth Ward) situated in wards previously entirely free from diphtheria. Of the 33 cases occurring from the 13th to the 31st of December 21 were in previously infected houses, and the remaining 12 in 7 houses were new invasions.

That the disease prevalent in Ashtabula was true diphtheria was proved by the finding of diphtheria bacilli in cultures made from a large number of the cases ill or convalescent between the time of my first visit, December 13, 1894, and January 13, 1895. During this time diphtheria bacilli were demonstrated in cultures made from the throats of 46 patients. Many of these were among the first cases attacked. At the time of my first visit 18 individuals had died of the disease. The cases examined by culture methods were not chosen especially for this purpose, but represented a fair average of the cases reported as diphtheria. My observations led me to the conclusion that all the cases reported as diphtheria during this time were true diphtheria, and that some mild cases had been overlooked, and that had routine bacteriological examinations been made earlier the number of reported cases of diphtheria would have been increased.

Of the 100 cases of diphtheria reported in December, 24 died. Previous to our arrival, Dr. A. W. Hopkins, the Health Officer of Ashtabula, was convinced that the milk-supply of the town had played an important rôle in the spread of the disease. As early as December 8th it was observed that all the infected houses received milk from the same source, and that milk-drinkers were more often and more severely attacked than others.

Dr. Hopkins's investigations showed that the milk-supply of the town was derived from two dairy farms, situated at opposite sides and

about two miles from the town. For convenience these two milk-supplies will be styled X. and Y. The Y. dairy supplied about two-thirds of the houses taking milk. No case of diphtheria occurred in households taking X.'s milk, except in two instances. In these cases, though regular customers of X., the individuals on one occasion obtained each a quart of milk from Y., and both had diphtheria two days later. With these exceptions all the cases of diphtheria were in households regularly supplied with Y.'s milk, which was distributed by two wagons, a red and a white wagon. The white wagon supplied houses in the town proper (Second, Third, Fourth, and Fifth Wards), and the red wagon the harbor (First and Sixth Wards).

The cases of diphtheria were entirely confined to houses taking the Y. milk. On inquiry at the Y. dairy farm it was found that the family consisted of four, Mr. and Mrs. Y., both well advanced in life, and two sons, aged respectively about twenty-four and twenty-six years. No help lived on the farm, which was conducted by the men of the family with the aid of one or two hired men. The three older members of the family were and had been perfectly healthy; but the younger son, Henry, had been taken ill December 1st with a "bad cold," and on the 3d complained of sore-throat, and on the 4th, while still attending to his duties, milking and delivering milk, he felt ill and had general body pains, and his "sore-throat" was much worse. Henry drove the white milk wagon, and the red wagon was driven by a hired boy. On the 5th and 6th he still complained of sore-throat and was too ill to deliver milk. He did not go to bed, but was able to go to the cow-barn several times during these two days. With the sore-throat there was pain on swallowing. His throat was not examined, and he was not under the care of a physician. His place on the milk wagon for these two days was taken by a hired man. On the 7th and 8th he was well enough to deliver milk, but on the evening of the 8th he was stopped by order of Dr. Hopkins. Two days later the dairy was quarantined and the sale of its milk prohibited. On December 9th Dr. Hopkins carefully examined Henry's throat, and found "the fauces reddened and congested and the right tonsil considerably enlarged, with distinct enlargement of the right side of the neck." There was no false membrane present. Henry said that his neck had been considerably swollen during the height of the attack of "sore-throat."

On December 13th, with Dr. Miller and Dr. Hopkins, I examined the Y. dairy. The dairy was found to be well ordered and clean, and the cows were in good condition. We could discover no sores, ulcers, or swellings of any kind on the teats, udders, or any other parts of their bodies. Their noses were free from disease. I made several cultures of Loeffler's blood-serum mixture from Henry's throat and nose, and a number of cultures were made upon the same medium from some

milk that had been standing in the house for a day, from some of the morning's milking, from some newly-made butter, from several delivery milk-cans, from two milk-dippers, and from the bell used in Henry's milk wagon. These cultures were carried to my laboratory in Cleveland that night and put in an incubator at body temperature. In none of these cultures was the diphtheria bacillus found. In the cultures made from Henry's throat there grew the *staphylococcus pyogenes aureus* and *albus*, and a long bacillus in no way resembling the bacillus diphtherie.

On December 17th I again made cultures from Henry's throat and nose and from samples of the morning's milking and from the milk-cans. At the same time a careful examination was made of each cow, but no evidence of any disease of their noses, mouths, teats, or udders was found. All the dairy appointments were clean. The milk-cans and utensils were carefully washed in hot water, I was informed, immediately after use. Those seen by us were bright and clean and quite dry. I was again unable to find the bacillus diphtherie in the cultures made from the above sources.

On December 18th cultures were made from samples of milk from all the dairy wagons in the town and from the city water-supply and from the water of several wells. From none of these sources were diphtheria bacilli obtained.

It is to be observed that all the cultures were made from the milk and milk utensils at a time when Henry's nose and throat were proved free from the bacillus diphtherie.

I personally investigated 44 of the 49 houses from which cases of diphtheria were reported between the 5th and the 13th of December. At the beginning of the epidemic there were in these 44 houses 212 individuals, 140 adults and 72 children. Of these 212, 62 (of whom only 26, or 41.3 per cent., were under sixteen years of age) had diphtheria between the 5th and 13th. Forty-two of these 44 households were regular customers of the Y. dairy, and received milk exclusively from this source. The two remaining households, though not regular customers, obtained milk from this dairy at this time. Of the 212 individuals exposed 78 drank milk regularly and freely, 118 took milk only in tea or coffee, 6 used only cream, and in 10 cases no record could be obtained. While diphtheria was by no means confined to those drinking milk, the proportion of milk-drinkers affected was much greater than in individuals taking milk only in tea or coffee. The average amount of milk taken per household was 1.2 quarts. Thirty-two of the 44 households investigated obtained milk from the white wagon driven by Henry, the remaining 12 being served by the red wagon. The milk was delivered only in the morning after the breakfast of most of the customers, and the milk used in tea and coffee was usually kept several hours at least before using.

Of the 212 individuals in the 44 houses investigated 62, or about 27 per cent., were attacked as first cases, while of the 150 individuals escaping infection in the first outbreak of the disease 23, or about 15 per cent., contracted diphtheria later, as secondary infections. If the 10 individuals who did not use milk or cream are left out of consideration, the percentage of primary infections rises to 32 per cent. of those exposed. Altogether in the 49 houses there were 100 cases.

It was not possible to ascertain the exact number of houses supplied with milk from the Y. dairy. It is safe to say that they did not number more than 150, and in this case there was an incidence of diphtheria in about one-third of the houses exposed. A number of households had their own cows, and all these households were free from diphtheria.

So sudden and widespread an epidemic must have had a single focus of infection. Besides the milk there is to be considered the possibility of infection by means of the water-supply or the presence of one or more diphtheria-infected individuals at some public gathering. Investigation showed that only a small proportion of the infected houses had the same water-supply. A number of the infected households used water from their own wells.

On November 28th several men came to Ashtabula exhibiting a model of a Swiss village. This entertainment was patronized by a number of children from both the town and from the harbor. None of these men were ill, and a large number of the families having diphtheria did not attend this exhibition. When the entertainment moved to an adjoining town no cases of diphtheria occurred there.

On December 6th the opening of a new store was largely attended, especially by children, to whom presents were offered. Few adults attended either of these gatherings, and it is to be remembered that in this epidemic the special incidence of the disease was in adults, especially the first cases.

The individuals attacked belonged to several religious sects, and no connection could be traced between churches and schools and the spread of the disease.

Besides the above, there were no general gatherings of people. An investigation of the meat and other market supply as a possible source of infection was equally negative.

So by exclusion and by the strong circumstantial evidence brought forward it is almost conclusively demonstrated that the means of spread of the epidemic was the milk of the Y. dairy.

There are several ways in which milk may become infected with diphtheria bacilli.

It seems established by the experiments of Klein¹⁰ that diphtheria bacilli inoculated into the shoulders of cows in a certain number of cases reach the udder and gain access to the milk.

According to Kanthack,⁸ Klein has inoculated virulent diphtheria bacilli into ten cows, in all of which there was local reaction, and in six there were severe visceral lesions. Five of these cows developed upon the udder a vesicular eruption which could be communicated to calves, and in milk of two of these cows the bacillus diphtheriæ was found. In some cases the bacillus diphtheriæ was found in the vesicles appearing upon the udders.

Abbott¹ repeated Klein's experiments, using two cows. Neither animal developed the udder eruption described by Klein, and careful study failed to show the bacillus diphtheriæ in the milk.

Klein,¹¹ in November, 1890, observed with Philpot, at Croyden, ulcers on the teats of cows in a dairy along the milk-supply of which diphtheria had invaded a number of households. These ulcers Klein considered identical with those occurring on the udders of cows inoculated by him with the bacillus diphtheriæ, and regarded these as the source of infection. He does not state whether or not he demonstrated the bacillus diphtheriæ in the ulcers of the cows of the Croyden dairy. Philpot was unable to trace the infection of the milk to a case of human diphtheria.

In the cows of a dairy the milk-supply of which Turner, of Hertfordshire, suspected as being the source of infection for a diphtheria epidemic, Klein again found ulcers on the udders and teats.

Klein¹² seeks, on the observation of Power on the Herndon scarlet fever epidemic, and on his own studies on the udder affections of cows, to establish a direct etiological relation between diseases in the udder in cows and the infection of the human subject with scarlet fever and diphtheria.

Power¹⁷ attributed the infection of the milk in his first milk epidemic of diphtheria to "garget," an inflammatory disease of cows' udders, which was present in some of the cows of the suspected dairy. In the study of an outbreak of diphtheria among the children of Princess Mary's House, it was found that some of the cows of the dairy supplying the institution had "garget." "Garget," or inflammatory mastitis of cows, is probably, like other suppurative affections, caused by a variety of micro-organisms.* There is no evidence that it is ever caused by the bacillus diphtheriæ. It is quite possible, however, that the infectious agent of the throat disease occurring in communities drinking the milk of cows with garget may be the streptococcus pyogenes, the organism so commonly found in the lesions of this disease of the udder.

* Streptococci have been found in the milk, pus, or tissues of the udders or the teats of cows with this affection by Kitt, Nocard and Mollereau, Adametz, Guillebeau, and others, and more recently by Stokes and Clement, of Baltimore. It seems probable that all these observers have been dealing with the streptococcus pyogenes. Guillebeau has also found bacilli identical with the bacillus of Freudenreich in the milk of cows with mastitis.

The passage of the streptococcus through the udder of the cow may very much enhance its virulence for man.

If these suppositions be correct the explanation of the etiology of some of the above described outbreaks of "diphtheria" is at hand.

Klein's conclusions were warmly opposed in the discussion by Crookshank, Ostertag, McFadyan, Himie, and others. It was suggested by several speakers that the lesions observed in cows' udders by Klein were those of cowpox.

It has been argued that the diphtheria of cattle and calves may be transmitted to man by means of milk. But it has been conclusively shown by Loeffler that the micro-organism of the diphtheria of cattle is quite distinct from the bacillus of human diphtheria.

While it has not been established that cows can have human diphtheria and can transmit the infectious agent by means of their milk to man, the contrary is not proved, and the whole subject must be held *sub judice*. Though it may be possible, it is quite unlikely, owing to the very small number of milk epidemics of diphtheria.

It is to be wondered at that milk is not oftener infected with diphtheria bacilli after it leaves the udder than does happen.

Flügge⁵ explains the small part played by milk and meat in the spread of diphtheria by presence in these articles of saprophytes which inhibit the growth of the bacillus diphtheriæ.

Air infection of milk by the bacillus diphtheriæ probably never occurs, because the organism is killed by the desiccation that must take place before it can be blown from place to place by currents of air.

Our present knowledge on this subject points strongly to the supposition that at least the most frequent mode of infection of milk with the bacillus diphtheriæ is from the hands, bodies, or clothing of milkers, dairy attendants, and milk handlers, who either have diphtheria themselves or have been intimately associated with diphtheria patients.

When milk is handled by such individuals there are many opportunities for its infection both at the dairy and during its distribution to customers. At Ashtabula the milk was carried in the dairy wagons in 10-gallon cans from which it was retailed, and was dipped with long-handled iron dippers. These, when not in use, remained in the cans, and at every movement of the wagon their handles were washed in the splashing milk. It is evident that if Henry Y. had the bacillus diphtheriæ on his hands, derived from his mouth, there was abundant opportunity for their distribution through the milk.

In the Ashtabula epidemic absolute proof of the distribution of the bacillus diphtheriæ by means of milk is more nearly approached than in any epidemic previously described.

The only link lacking in the chain of evidence is the failure to demonstrate the bacillus diphtheriæ in the nose or throat of Henry Y.

The lack of positive evidence in this particular does not, in our opinion, militate very strongly against this explanation of the spread of the disease. The cultures were made at least five or six days after the subsidence of the throat symptoms and the probable disappearance of the false membrane. As is well known, the time for which the bacillus diphtherie remains in the throat after the disappearance of the false membrane is very variable.

In 752 cases of diphtheria examined by Park²² the bacillus diphtherie had disappeared from the throat in three days after the disappearance of the false membrane in 325 cases, and in 201 cases it persisted for from five to seven days.

If Henry Y. did have diphtheria there are numerous ways by which he may have infected the whole milk yield of the Y. dairy. He assisted in milking, and after each milking the milk from all the cows was mixed before its distribution. The special incidence and severity of the cases of diphtheria along his milk route may be explained by the manner in which the milk was obtained from the cans—with the long dippers, the handles of which were constantly washed in the milk.

The results of the quarantine methods pursued are instructive. The usual rule of the Health Officer was that a diphtheria infected house should be quarantined for fifteen days after the disappearance of the false membrane in the last case in the house. After bacteriological examinations were instituted in these cases the duration of the quarantine was governed entirely by the results of these. As a consequence many cases were released after a much shorter period of quarantine than under the old rule, and, on the other hand, some cases were shown to have in their mouths large numbers of virulent bacilli diphtherie for some days after the prescribed time. Our experiences in this direction do not materially differ from those of other observers. In most cases the bacilli disappeared from the throat by the fifth or sixth day after the disappearance of the false membrane.

In conclusion, I desire to express my thanks to Dr. Miller, of the State Board of Health, to Dr. A. W. Hopkins, Health Officer of Ashtabula, and to other physicians of Ashtabula for many kindnesses and courtesies extended to me during these investigations.

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THE SURGICAL TREATMENT OF SUPPURATIVE PERICARDITIS.¹

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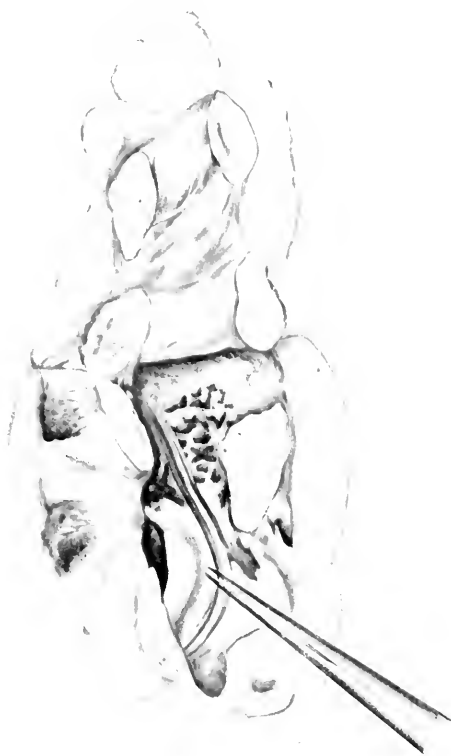
THE invitation to open the discussion on this topic has been accepted with pleasure, because I have long been interested in pericardial surgery. Studies made some twenty years ago convinced me that effusions in the pericardium should be treated by surgical measures similar to those adopted in pleural accumulations. At that time (1876) I suggested that purulent pericarditis be treated by the insertion of a drainage-tube into the pericardial cavity.² The proposal was thought by many to be rash and unworthy of surgical consideration.

Rosenstein, however, adopted this method of dealing with the disease in 1879, and saved his patient. He was followed by West, in 1882, with equally gratifying success. It has been supposed that these were the earliest recorded cases in which suppuration within the pericardium had been treated by incision and permanent drainage. Within a few weeks, however, I have found reported³ the case of Hilsmann. (Case

¹ Read at the meeting of the American Surgical Association, May 4, 1897.

² New York Medical Journal, December, 1876. *Idem*, April, 1877, p. 384. Paracentesis of the Pericardium, Philadelphia, 1880, p. 55.

³ Ueber die Paracentese des Pericardiums. F. A. Hilsmann, Kiel, 1875.



Author's Chondro-plastic Method of Pericardotomy, by a Trap-door Excision of Costal Cartilages, which avoids Injury to the Pleura and Internal Mammary Vessels.

[The flap, consisting of portions of the fourth and fifth cartilages and the attached soft parts, is turned upward, exposing the left lung covered with pleura and the internal mammary vessels. The forceps is seen holding the vessels and the edge of the pleural sac outward, so as to expose the white pericardium, in which an opening, indicated in black, has been made.]

No. 1 in table.) He operated in 1844 upon a man who had been sick about eight months, and evacuated several tumblerfuls of pus by an incision in the fourth intercostal space. The opening was kept patulous by the frequent insertion of a probe. The patient recovered. Langenbeck,¹ in 1850, treated with similar success a purulent pericarditis occurring subsequent to necrosis of the ribs due to gunshot-fracture. (Case No. 2 in table.)

I reached the conclusion in 1881² that pericardial incision and suture of cardiac wounds might be successfully accomplished, and should be undertaken. Dalton,³ within recent years, successfully resected six inches of the fourth rib for stab-wound of the pericardium and sutured the pericardial sac with a continuous catgut suture.

Williams⁴ successfully ligated wounded internal mammary vessels and stitched the pericardium in a patient who had been stabbed and received a wound of the heart-wall. He resected part of the fifth cartilage. The patient was well over three years later. Schnitzler⁵ protected a torn pericardium with iodoform gauze when suturing was difficult. The pericardium has been torn and the heart exposed during the resection of the thoracic wall for chondroma, and recovery has followed. Rehn recently showed,⁶ at a meeting of German surgeons, a man upon whom he had fourteen days previously sutured a stab-wound of the right ventricle after costal resection and enlargement of the pericardial wound. A stab-wound perforating the pericardium, going through the diaphragm and injuring the liver, was treated successfully by Bouffleur,⁷ who opened the abdomen and sutured the diaphragm. Ferraresi⁸ resected three costal cartilages in a wound of the mammary artery and heart, and used gauze, applied with moderate pressure, to restrain the bleeding from the heart-wall. The injury of the cardiac muscle was not deep. His patient recovered.

These reports prove that the pericardium and heart do not resent a properly conducted surgical attack, and render a discussion of the topic selected valuable.⁹

PERICARDOTOMY and provision for thorough drainage are always demanded by the presence of pus in the pericardial sac. The etiology of the purulent condition should have no influence in deciding the question of treatment.

¹ Vorlesungen über Akiurgie, Berlin, 1888, p. 449.

² Annals of Anatomy and Surgery, Dec., 1881, p. 250, and Medical News, January 13, 1883.

³ Annals of Surgery, 1895, xxi. p. 147.

⁴ New York Medical Record, March 27, 1897, p. 437.

⁵ Rullier in Arch. de Méd. et de Pharm. Militaire, January, 1896, p. 110.

⁶ Medical News, December 5, 1896.

⁷ Chicago Clinical Review (1892-93), i. p. 30.

⁸ Gazz. Med. di Roma, 1896, xxii. p. 29.

⁹ Parrozzani has recently cured by suture of the heart a case of penetrating stab-wound of the left ventricle. Reported by Brock in Lancet, July 31, 1897, p. 260.

The suppurative pericarditis may be primary—a rare condition,—it may be secondary to serous or hemorrhagic pericarditis, to suppurative pleuritis or mediastinitis, to septic processes in distant regions, or to trauma; but the surgical indication is unvarying. Tubercular pericarditis, and pyopericardium, due to rupture into the pericardium of an abscess situated below the diaphragm¹ or elsewhere, require in the same way pericardotomy and removal of the puruloid or purulent accumulation.

The accessory treatment must be varied in accordance with accompanying general or local deviations from the physiological state. Rheumatism, scurvy, pneumonitis, pleuritis, tuberculosis, empyema, abscess, and pyemia require efficient medicinal and surgical therapeutics. The remedial measures employed for these conditions must never, however, be allowed to interfere with the instant and complete rescue of the heart from the dangers incident to the presence of pus in the pericardial cavity.

Let the attendant administer antirheumatic, antiscorbutic, tonic, or other remedies, and aspirate, tap, or drain pleural sac or abscess-cavity; but these important measures must not delay the essential incision into the pericardium.

The improbability of pus becoming absorbed is great in all suppurative lesions; caseation or absorption of puriform material in tubercular conditions does not generally occur. It has been said² that small pleural empyemas may undergo spontaneous cure, but this is by no means to be expected. Modern surgery seldom suspends its activity when purulent or puruloid deposits in any region are to be treated. Such deposits within the pericardium demand early evacuation even more imperatively. The mechanical effects of the hydrostatic pressure on the heart's action and the degenerative changes indirectly produced in the cardiac muscle must be averted.

The diagnosis of pericardial exudation is made by the physical signs and the symptoms. That the fluid in the pericardium is pus must usually be demonstrated by exploratory aspiration. When this confirmatory evidence has been obtained, pericardotomy is to be performed with as little delay as is commensurate with satisfactory operative facilities.

Thick pus, shreds of floating lymph or false membrane, or a needle of too small calibre may interfere with the demonstration expected by the use of aspiration. Under such circumstances the surgeon may be pardoned for delaying operative treatment a little while. A few days' time, not more, may be given to further study and therapeutic expect-

¹ See Varga's case, *Gaceta Médica de México*, 1887, xxii, p. 256.

² Parker, *Trans. London Clinical Soc.*, 1889, xxii, p. 66.

tation; then an exploratory incision down to the pericardium must be made if the physical signs continue to suggest effusion.

Purulent pericarditis sometimes causes no fever and no local edema. A dilated heart may present signs and symptoms so similar to pericarditis with effusion that inspection of the heart or its surrounding sac may be the only means of ascertaining the truth. I recommended diagnostic incision in such obscure cases as long ago as 1881,¹ and have seen no reason to change my opinion as to its value and desirability. If there is a probability, therefore, that the patient's urgent symptoms are due to either pericardial effusion or cardiac dilatation, and competent medical examiners cannot determine the exact lesion, exploratory incision is to be adopted. If this establishes the fact of effusion, puncture of the exposed pericardium will prove or disprove the existence of pus or serum. If pus be found, an incision should be made and permanent drainage established by stitching the pericardium to the skin or inserting tubular or gauze drains. Should the effusion prove to be serous, the puncture may be utilized to evacuate the entire quantity of effusion, and drainage may be omitted. The fluoroscope and skiagraphs will sometimes aid in diagnosis of obscure cases, but the apparatus is not always obtainable.

There is little dissent from the opinion that purulent accumulations in all regions require surgical intervention, lest the patient die of septic sequences or the pus be evacuated into neighboring cavities before nature can provide for its spontaneous exit. The supposed vulnerability of the heart long prevented the application of this principle of treatment to the pericardium. As a consequence, patients died with several pints of pus in the pericardium,² and autopsies sometimes revealed a burrowing sinus, reaching nearly to the surface; proving that the imprisoned pus was vigorously endeavoring to escape, that life might be saved.

Numerous recorded cases show the inutility in purulent cases of tapping, even if repeated. Gooch³ tapped a case six times and injected iodine solution. The patient died in thirty-eight days. The survival for such a long period suggests that the boy might have been saved if the purulent fluid had been evacuated by incision at the first operation. In a case reported by Doubleday⁴ seventeen pints of pus were withdrawn from the pericardium by ten aspirations in the course of thirty-four days; then death occurred. In Villeneuve's case⁵ recovery subsequent

¹ *Annals of Anatomy and Surgery*, December, 1881, p. 250.

² In the *New York Medical Record*, March 9, 1895, p. 314, is recorded a case in which 2600 c.c. of pus and lymph were found at autopsy. See also *Brit. Med. Journal*, December 1, 1888, p. 1219; *Gaz. Hebdom. de Méd. et de Chir.*, January 12, 1883, p. 25, and *Brit. Med. Journal*, 1885, i. p. 1246.

³ *Brit. Med. Journal*, June 19, 1875.

⁴ *New York Med. Journal*, September 1, 1888, p. 232.

⁵ *London Med. Rec.*, September 15, 1875, p. 532.

to pericardicentesis occurred after the persistence of a fistule at the seat of operation for nearly six months. The effusion was originally serous, but became purulent.

Death occurring after tapping has revealed great quantities of pus still in the pericardial sac, though large amounts had previously been removed. Smith found¹ thirty-six fluidounces at autopsy, though thirty fluidounces of pus had been withdrawn by aspiration. In some cases the original accumulation had been incompletely withdrawn; in others more pus had formed and had been denied escape because no permanent opening had been provided. In an autopsy made by Parker, in a case not operated upon, the distended pericardium reached to the anterior vertical axillary line on both sides and "sat like a saddle upon the lungs."²

Such observations show that aspiration and puncture afford only temporary relief in suppurative pericarditis, and that a free exit for the pus must be maintained for a varying length of time, until the internal surfaces of the cavity become modified or mutually adherent. The entrance of air into the pericardium during this time does no harm.

DRAINAGE of the pus may be maintained by stitching the incised pericardium to the edges of the cutaneous wound, by the insertion of drainage-tubes, or by the introduction of a gauze wick, which must be frequently renewed. Stitching the pericardium to the edges of the wound has the advantage of possibly preventing pus leaking into the pleural sac, if it has been opened by the surgeon during the pericardotomy. The method of operating which I recommend avoids this contingency. If, however, the pleura is cut, suture of pericardium to the skin is a judicious procedure when it can be done, for there is little doubt that secondary pleuritis, due to infection from leakage of the pericardial pus, is a real danger. Delorme and Mignon report³ a case of suppurative pericarditis which died after tapping with a trocar in the fifth interspace 6 cm. to left of the sternal border. Pleuritis occurred suddenly after the pericardial tapping. Autopsy showed that the pleura had been wounded, and the pus in the pleural sac had similar bacteriological characteristics to that in the pericardium.

If the pleura is known not to have been punctured, drainage by a large but short rubber tube is probably the best method. It does not need renewal as does the gauze wick, and can be utilized for irrigation if the surgeon decides to use irrigation. Two short drainage-tubes, placed side by side, like the barrels of a double-barrel shotgun, are the most satisfactory in cases where irrigation is to be employed. The cleansing or antiseptic fluid is then allowed to flow in through one

¹ New York Med. Rec., February 12, 1876, p. 110.

² Trans. Clinical Soc., London, 1889, xxii., p. 63.

³ Revue de Chirurgie, 1895, xv., p. 1016.

tube and out through the other, as in washing out the bladder by a two-way catheter. The catastrophe which happened in Parker's case (No. 14 in the table) would not then be likely to occur. His patient apparently died from pressure on the heart made by the irrigating fluid failing to escape from the pericardial sac.

THE PROGNOSIS after incision and drainage is good, provided the operation is done early and no serious complications have preceded or followed the surgical treatment. West saw his first case nine years later in good health, and Davidson's case had no cardiac or pulmonary symptoms when seen nine months after operation. Many of the cases of death recorded in the subjoined table are attributable to pyæmic infection, of which the pyopericardium was a mere incident. The relief due to the evacuation of the pus was great, but naturally it alone could not restore the patient to health, and he died of his general disease. In some cases death would probably have been averted if the pericardial condition had been promptly and efficiently treated. Delay causes myocarditis, cardiac debility, and exhaustion of the patient in secondary suppurative pericarditis; and in primary suppuration within the pericardium gives opportunity for general septic infection in addition to these risks.

The combination of pleuritis and pericarditis is quite frequent. It is probable that either may be the primary condition, leading to the other as a secondary inflammation by contiguity of structure or continuity of vascular connection. The histories in the table seem to show that, in some instances at least, the pleuritis has been caused by the surgeon's pericardial puncture or incision being made through the pleural sac, and thereby permitting its direct infection from the pus in the pericardium. This can be avoided in nearly every case by a properly planned operative attack.

The prognosis is sure to be bad in cases where delay has permitted enormous quantities of pus to distend the long-suffering pericardial sac, the patient's strength to be exhausted, his kidneys congested, the cardiac muscle degenerated, and perhaps the pericardial pus evacuated by ulceration into the bronchial tubes.¹

The results obtained by incision and drainage in tubercular peritonitis suggest that drainage in tubercular pericarditis may lead to a permanent cure. The ease with which the pericardium can be irrigated with solutions of iodoform would seemingly add to this probability of success.

RESULTS. In the table of thirty-five cases of suppurative pericarditis of all kinds treated by incision fifteen recovered and twenty died. This gives a ratio of recovery of nearly 43 per cent. Of the fatal cases

¹ Allende's case. *Revista de la Sociedad Medica Argentina*, 1895, iv. p. 20.

ten at least were evidently septic before operation. Excluding those known to be septic, only ten died out of the thirty-five cases. Of these ten there are complications, such as purulent pleuritis, or pleural, pulmonary, renal, or cardiac lesions mentioned in every instance except one, in which no statement is made (Case 28). Such a showing is very satisfactory when it is known that without operation practically all cases die, and that with repeated aspiration nearly every case reported has terminated fatally. The experience of Fiedler¹ and others shows that this statement is true.

In a few cases, as in that of Villeneuve,² aspiration has been followed by recovery because nature established drainage by the formation of a fistule. Doubleday³ states that Wyss reports a case of pyopericarditis in which a fistule formed spontaneously and lasted for years. Death finally occurred from an attack of acute pericarditis. In Newman's case (No. 9 of table) aspiration was repeatedly performed; but after a month of this palliative treatment drainage and subsequently incision were adopted. When death occurred, a few days later, it was discovered that nature had been endeavoring to supplement the surgical treatment by establishing in the second interspace a fistule from the pericardium to the surface. The canal had reached the subcutaneous tissue, but had not yet perforated the skin. This case shows nature's contempt for anything less than complete evacuation of purulent effusions, and is an indication that the proper surgical treatment in suppurative pericarditis is incision and drainage.

It is true that Douglas⁴ reported a case of pus in the pericardium, treated by simple aspiration, that had not died up to the time of the report. The report, however, was made only thirty days after operation, and then the patient was expectorating purulent matter, due possibly to a communication between the pyopericardium and bronchial tubes. This case, therefore, affords no argument in favor of delaying incision and drainage. Langenbeck mentions⁵ a case which was cured after the use of the trocar, but he gives no details. The trocar may have been so used as to permit permanent drainage.

Incision has also the advantage of reducing to a minimum the danger of wounding the heart. This organ has been punctured on a number of occasions in attempts to tap a distended pericardium with a trocar or an aspirating needle. Sometimes this has occurred from a mistaken diagnosis. It may also happen, however, because the heart has become adherent to the anterior wall of the pericardium. Even with such

¹ Sammlung Klinischer Vorträge, innere Medizin, 1881, No. 72.

² London Medical Record, September 15, 1875, p. 532.

³ New York Medical Journal, September 1, 1888, p. 232.

⁴ Trans. Detroit Medical and Library Association, January, 1879, and Paracentesis of the Pericardium. John B. Roberts, Philadelphia, 1880, p. 93.

⁵ Vorlesungen über Akiurgie, Berlin, 1888, p. 450.

adhesion a large and dangerously oppressive effusion may exist behind and at the sides of the heart. Diagnosis may then be difficult, because the heart-sounds will not be muffled.

Barlow reports¹ experimental punctures made after death on two cases of pericardial effusion. All the punctures made to the left of the sternum resulted in the aspirating needle entering the heart-wall and obtaining no fluid; but punctures made at the right side of the sternum reached the effusion without cardiac injury. The distinctness of the heart-sounds during life induced him to hesitate in adopting pericardicentesis, for the diagnosis was not certain. If he had aspirated in the usually accepted locations, he would have injured the heart and would have obtained no fluid; if, however, he had adopted incision as recommended in this paper, the diagnosis would have been cleared up, the fluid found, and the lives of the patients possibly saved.

Money relates² a very remarkable case where at autopsy twenty-four fluidounces of pus were found in the pericardium, "almost entirely stowed away behind the heart." The amount was not appreciated, even when the chest was opened, until the heart was moved. I and others have invented peculiar aspirating needles to avoid wounding the heart, when the effusion has been nearly all evacuated; but these devices will not avert puncture of an adherent heart or evacuate serum or pus confined behind the heart by intrapericardial adhesions.

Delorme and Mignon found³ in one of their dissections a vein of such size lying on the front of the pericardium that a free hemorrhage would have resulted from its puncture. Such a complication is avoided by operating by an incision, which also prevents injury to the internal mammary veins and artery, should they be unusually located.

These observations and other reported cases not here mentioned have almost convinced me that incision is better than aspiration even in cases not supposed to be purulent. It establishes diagnosis in dubious cases, avoids cardiac injury, saves the pleura from puncture, affords complete evacuation of effusion, permits extraction of thick pus and membranous lymph, and gives opportunity for disinfection of the sac when that is necessary. Rullier⁴ found it necessary to finally incise and drain a serous pericarditis which he had previously aspirated four times, even following the aspiration on two occasions with injection of tincture of iodine. The incision was done under local anaesthesia with cocaine. The patient recovered.

IRRIGATION has been adopted as an adjunct to incision in a number of cases. No immediate harm has seemed to result except in Parker's

¹ British Medical Journal, December 1, 1888, p. 1220. See also Churton, Trans. Clinical Soc of London, xxv. p. 43.

² Lancet, October 18, 1890, p. 818.

³ Revue de Chirurgie, 1895, p. 829.

⁴ Arch. de Méd. et de Chirurgie Militaire, January, 1896, p. 7.

case (No. 14); the child in that instance died during the irrigation, immediately after the incision, apparently from pressure on the heart exerted by the irrigating fluid. Irrigation was used to encourage the evacuation of the thick pus, which did not flow well; but the water did not escape on account of the pericardial opening becoming plugged with thick pus or membranous lymph. The child was pyæmic, and the heart, which was very weak, stopped beating.

It is certainly essential that the outflow of fluid be unimpeded when irrigation is employed. The fact that plugging, sufficient to prevent the escape of the irrigating fluid, occurred in this case would seem to indicate that something more than an incision was needed to empty the pericardium of the fibro-purulent material clogging the heart's action. Parker believes that he would have done better if he had given the heart a little time to recover strength after the first gush of pus before endeavoring to clear out the sac by irrigation. This would probably have been judicious.

The opinion of Sievers¹ that irrigation tends to produce adhesions and may delay convalescence is difficult to accept. The occurrence of intrapericardial adhesions to a greater or less extent would seem usually probable in suppurative pericarditis treated by evacuation; but case No. 18 seems to indicate that they need not occur.

More than one autopsy, made a long time after recovery from pericarditis, in non-suppurative cases, has shown the presence of adhesions. These were formerly thought to be the essential of cure. Pepper's case² showed complete adhesion fifteen months after aspiration.

Irrigation carefully performed with warm fluid gradually admitted to the pericardium, and given free vent by using two parallel drainage-tubes in the wound, ought to be beneficial in ridding the cavity of shreds of lymph and pus, and may perhaps modify the walls of the sac. I should prefer sterile salt solution at about 100° or 105° F., and would use it in cases in which there was much lymph mixed with the pus. If the heart is very weak, it may be wise to wait for a few hours after the pericardotomy. Daily repetition of the irrigation seems desirable if the drainage instituted does not keep the sac empty.

Weak antiseptic solutions are unobjectionable for irrigation, but probably unnecessary. It has been suggested that the reflex irritability of the heart is modified by the false membranes, and that consequently irritants applied by irrigation cause little cardiac disturbance.

I would not inject solution of hydrogen dioxide into the sac, lest the effervescence within the cavity cause injurious cardiac pressure.

The direct extraction of shreds and membranous sheets by fingers and

¹ *Zeitsch. für klin. Med.*, 1893, xxiii, p. 45.

² *Paracentesis of the Pericardium*, John B. Roberts, Philadelphia, 1880, p. 79, and *New York Medical Journal*, December, 1876.

forceps is certainly judicious, when they can be seen or felt. Exploration of the interior of the pericardium with the finger and palpation of the heart itself are not objectionable under appropriate circumstances.

If the pyopericardium is one in which the pus is free from lymph and flows freely, irrigation may be unnecessary.

THE SITUATION at which the pericardium should be opened by simple tapping and by open incision deserves careful attention. In a former study¹ I reached the conclusion that the best two points for pericardicentesis were close to the base of the ensiform cartilage, in the fossa between it and the seventh left costal cartilage and the fifth left intercostal space, at from 5 to 6 cm. (2 to 2½ inches) to the left of the median line of the sternum. Of these two points preference was given to the latter for aspiration, even though its selection rendered perforation of the pleural cavity almost certain; but the importance of avoiding pleural injury in cases treated with a drainage-tube was recognized.

The puncture near the ensiform cartilage was regarded as an efficient route to the pericardium and one pretty sure to make the needle enter the pericardium without wounding either pleural sac. The chief risk in this location, perhaps, is that the diaphragm may be punctured if pericardial effusion is not present or if the surgeon does not direct the needle a little upward as he perforates the thoracic wall. Rotch's point in the fifth interspace, at 4½ to 5 cm. to the right of the edge of the sternum, is objectionable because it opens the right pleura.

The danger of infecting the left pleural cavity by the pus within a pyopericardium, when the pericardium is punctured or incised in a location which causes a penetrating wound of the pleural sac, is not a theoretical one. This is shown by cases in which serous or suppurative pleuritis has arisen, after pericardicentesis or pericardotomy in the usually selected locations known to open the pleura.² While it is true that pleuritis may occur as the primary condition and pericarditis as the secondary lesion, or that both may arise from the same cause, clinical and bacteriological experience seems to show that direct infection from the pericardium to the pleura is a real danger. It is probably much less real, to be sure, in cases of hydropericardium or serous pericarditis than in suppurative pericarditis, since the effusion is apt to be less infective in character.

Ferrand³ believes the point of election for tapping the pericardium to be in the fifth intercostal space, in a line vertically below the nipple, when the effusion is moderate; in the sixth intercostal space, on the

¹ Paracentesis of the Pericardium, Philadelphia, 1889, pp. 65 and 67.

² *British Medical Journal*, December 1, 1888, p. 1220; *North American Journal of Homœopathy*, New York, June, 1889, p. 392; see cases Nos. 3, 32, and 34 in table; Ashby's case of pericardial tapping through lung from scapular angle is interesting; *Lancet*, March 29, 1884, p. 560.

³ *Contribution a l'Etude de la Paracentèse du Péricarde*, Bordeaux, 1893, p. 45.

same vertical line, if the signs denote a large effusion. He arrived at these conclusions by studying the limits of the pericardium and the downward displacement of the diaphragm after experimental introduction of fluid. He found that the arch of the diaphragm was lowered about 2 cm. in the recumbent position when 600 grammes of fluid were introduced, and that the depression was 3 cm. when the cadaver was put in a sitting posture. With 1100 grammes of plaster solution in the sac the cardiac apex at the left angle of the pericardium was at least 6 cm. from the thoracic wall. Delorme and Mignon found¹ the pericardium to be from 3 cm. to 5 cm. from the surface of the skin in cadavers.

Ferrand's points would puncture the pleural sac, and are, therefore, as unsatisfactory as that recommended by me in the fifth interspace.

Numerous dissections made by Delorme and Mignon show² that the edge of the left pleura is very variable in its relation to the left border of the sternum, and that the accepted points of puncture on the left side must often wound the pleura. This observation holds good for infants as well as adults. Puncture in the fifth and sixth interspace close to the sternum will not assure safety to the pleura, though it was formerly thought that here the pleura was out of harm's way.

That pathological lesions change the pleural relations to the pericardium very little was apparently proved by their dissection of cases of pericarditis and by injecting fluid into the pericardium. This is not surprising when it is recollected that the parietal pleura is fixed to the thoracic wall.

The statement made by Fowler³ that the boundaries of the pleura are greatly displaced in pericardial distention is, I believe, erroneous. The lungs are usually displaced, and may be thrust far backward by the distended pericardium sitting upon them like a saddle; but the pleuræ seem to hold their usual relations to the anterior wall. Of course, the two layers may in some cases become adherent by a local pleuritis, and thus lead to local obliteration of the pleural cavity.

My dissections lead me to believe that Delorme and Mignon are correct in stating that the pleura is in great danger of injury from the punctures usually made. The left pleura in many dissections made by these writers was out of the way, however, of a puncture made in the left xiphoid fossa.

These considerations lead me to the conclusion that, in cases of suspected suppurative pericarditis, the exploratory aspiration to determine with certainty the existence of pus in the pericardium should be performed in the upper part of the left xiphoid fossa. The needle should

¹ *Revue de Chirurgie*, December, 1895, p. 830.

² *Ibid.*, December, 1895, and January, 1896.

³ *Trans. American Surgical Association*, 1896, xiv, p. 161.



Robert

Ferran

Skiagraph of a cadaver, in the pericardium of which about 740 c.c. of plaster-of-Paris solution had been injected. Tacks were thrust into the chest at the points recommended for aspiration by Rotch, Ferrand, and Roberts. The nipples are marked by the buttons.

be thrust upward a little and toward the median line of the sternum. In fat patients a small cutaneous incision should be made if it is difficult to locate with certainty the top of the xiphoid fossa. If this establishes the diagnosis, the pericardium should be incised and drained by resection of the fourth and fifth costal cartilages on the left side of the sternum, in the manner devised by me and described hereafter.

It is probable that even in non-suppurative pericardial effusions the left xiphoid fossa is the place of election for aspiratory puncture; but it does not afford room for incision and drainage. Hence in suppurative cases costal resection is to be adopted, because the pleura can then be readily pushed aside; the internal mammary artery, which may be as large as the radial, preserved from injury; and the surgeon have room for extraction of membranes or clots, or for any intrapericardial manipulation demanding fingers or forceps.

More than one instance is recorded where an incision or puncture evacuated the pericardial effusion found to exist into or through the left pleural cavity. In some cases the operation was performed for a supposed pleural effusion; but a distended pericardium was found to exist, and was then tapped through the original wound. The cases of West (No. 6), Savory (No. 7), and Gussenbauer (No. 11) are illustrations of this error of diagnosis.

West speaks¹ of a purulent pleuritis in which the needle, after being thrust into the pleural sac and obtaining pus, failed to perforate the pericardium. The pericardial symptoms diminished, and he believed that the pericardium had been nicked and had then drained into the pleura.

RESECTION OF THE THORACIC WALL for obtaining access to the pericardium has been proposed or done by Ollier, Durand,² Delorme and Mignon,³ and Williams.⁴ Durand's operation is a modification of that recommended by Ollier, and consists of the following steps:

"A cutaneous incision on the fifth costal cartilage, parallel to it and from 6 to 8 cm. in length. It should commence at the middle line.

"Isolation and rapid denudation of the cartilage with the aid of the bistoury.

"Resection of this cartilage, which should be commenced by separating it from its sternal attachments and raising it from within outward.

"To these fundamental manœuvres is added ligature of the internal mammary vessels at the upper and lower borders of the wound. These organs are thus put out of danger of secondary ulceration or of acci-

¹ British Medical Journal, December 1, 1888, p. 1220.

² Revue de Chirurgie, 1896, No. 6.

³ Ibid., December, 1895, and January, 1896.

⁴ New York Medical Record, March 27, 1897, p. 437.

dental perforation during the operation. The fingers then detach the *triangularis sterni*, the operative importance of which Delorme and Mignon have clearly shown. The fingers are then carried toward the middle line *under the sternum* and recognize the pleura. The distended pericardium is then seen. Displacement of the pleural sac is then attempted, the situation of which sac scarcely appears to be changed by the pericardial distention."

At this moment, if the displacement of the pleura is insufficient, or if the pericardium is hidden behind the sternum, the border of the sternum is cut away.

"Incision of the pericardium, which is widely accessible to sight and touch."

After some little work on the cadaver I propose the following operation for pericardiotomy: The details are, I believe, in some respects new, though the writers just mentioned have suggested simpler methods. After I had proved to my satisfaction the efficiency of the method on the dead subject, and its reliability in avoiding pleural wound, I was gratified to find that much the same method of opening the thorax had been used by Williams¹ in a case of stab-wound requiring pericardial suture, which had healed favorably. His operation was not devised to prevent pleural injury, but to get access to a wounded internal mammary artery. I had supposed my method entirely novel until I recently saw his paper.

My dead-house investigations and his experience on the living patient supplement each other in a way that convinces me of the admirable character of the operative procedure which I advocate.

The operation consists in making a sort of trap-door, consisting of portions of the fourth and fifth costal cartilages, which is turned upward by utilizing for a hinge the soft tissues in the third intercostal space. A vertical incision is made about 1 cm. to the left of the median line of the sternum, beginning on a level with the top of the fourth costal cartilage. This cut is carried through the skin and subcutaneous tissue to the sternum, and is continued downward to a point corresponding with the level of the upper border of the sixth cartilage. The length of this incision is from 4 to 5 cm.

A second incision is made parallel to the first, beginning at the upper border of the fourth rib, at from 4 to 5 cm. to the left of the commencement of the first incision. It is continued downward from the top of the fourth cartilage to the upper border of the sixth cartilage. The curve of the sixth cartilage requires this incision to extend downward a little further than the first vertical incision; but as the fourth rib also is a little concave upward, the second cut is nearly of the same length as the first. The second incision is made deep enough to divide all the

¹ Loc. cit.

tissues down to the cartilages. The lower ends of these two incisions are joined by a third cut carried along the upper border of the sixth costal cartilage.

The soft tissues to the left¹ of the first incision are separated from the sternum and pushed outward, so as to disclose the exact situation of the articulation of the fourth and fifth costal cartilages with the sternum. With a large scalpel, having a thick back, the fourth and fifth cartilages are divided as near as possible to the sternal border in such a way as to leave a bevelled surface of the cartilage attached to the sternum looking forward and outward. This section of the cartilages may be made with a Hey's saw, if the surgeon prefers. A thick-backed scalpel, with a cutting edge having a large belly, will be found a satisfactory and safe instrument with which to divide the cartilages with the least danger to the tissues in the mediastinum.

The next step consists in dividing the cartilages immediately under the outer edge of the flap in a similar manner, leaving a bevelled surface to the portion left attached to the rib, which looks forward and inward toward the median line. The incision is near the junction of the ribs with the cartilages. Care must be observed to make the incision through the cartilage of the fifth rib vertically under the incision in the cartilage above. The tendency is to bring the incision inward toward the median line of the body, so that the opening made in the chest-wall becomes too narrow at the bottom of the flap.

In dividing the cartilages the operator must be cautious not to puncture the pleura, which is closely attached to the inner surface of the costal cartilages at the outer margin of the flap. There is less danger in making the costal incisions near the sternum, because in that region the muscular fibres of the triangularis muscle are immediately beneath the cartilages. The surgeon, having divided the cartilages completely, next cuts the intercostal muscles and soft tissues in the fifth, fourth, and intercostal spaces and along the upper border of the sixth cartilage.

The chondro-plastic flap is then carefully raised from its lower border and the tissues of the mediastinum are cautiously separated from the internal surface of the resected cartilages and the intercostal muscles. The trap-door is thus opened on the hinge at the upper border and the triangularis muscle exposed. Upon it, about 1 cm. from the border of the sternum, is seen the internal mammary artery and its two accompanying veins running parallel to the sternal edge. At the outer portion of the window the muscular fibres and fascia are thinner and cover the lung and pleura. An incision is made through the triangularis muscle, close to the sternum and therefore within the line of the

¹ "Left" means the patient's left.

internal mammary vessels; and is carried up and down as far as the opening in the chest-wall will permit.

With the finger or a curved blunt instrument the surgeon then separates the fascia and muscular fibres and pushes the outer part with the vessels and the double edge of the pleural sac outward toward the external border of the opening. The shining white surface of the pericardium is then seen lying behind the sternum and along the inner portion of the opening. The pleura, which often has considerable fat along its edge, like the appendages of the colon, may not be seen, because it is pushed out of the way without having the overlying fatty tissue separated from it. If it is seen, its transparency or pinkish color will distinguish it from the white and more opaque pericardium.

Injury to the vessels or pleura is thus averted during the pericardotomy, because they are pushed away from the proposed opening into the pericardium. The pericardial sac is incised vertically or obliquely between the sternal border and the displaced vessels and pleura and a drainage-tube inserted. The length of the incision into the pericardium should be sufficient to permit extraction of membranes and thick pus. The surgeon's finger may be introduced for exploration.

If irrigation is employed, it is best to use two tubes, one to admit the fluid, the other to give it free exit. The drainage-tubes are introduced and brought to the surface through the fifth intercostal space, after trimming away the lower portion of the flap; and the chondro-plastic flap laid in position. If it is preferred, the tubes may be brought out through holes made in the flap between the fourth and fifth cartilages. The bevelled cartilages fit accurately together, and the flap will show little tendency to drop inward, even if the lungs and pericardium fail to support it. The cartilages may be sutured with catgut by passing the needle through their substance. In cutting the cartilages obliquely during the early part of the operation it is desirable not to bevel them too much, because the internal edges then project so far that it is difficult to get under the sternum. The bevelled surface should make an angle of about 45° with the internal surface of the cartilage.

It may be objected that this method of resecting the thoracic cage does not open the pericardium at its very bottom. It might be suggested to resect the fifth and sixth cartilages instead of the fourth and fifth. I prefer not to do this, because there is considerable danger of opening the abdomen when separating the outer end of the sixth cartilage from the underlying tissues. This danger would be less, of course, if a pericardial effusion had pushed the diaphragm downward. The manner in which the outer portion of the costal cartilage of the sixth rib runs obliquely downward renders the danger more imminent than might be supposed. Another objection to resecting the sixth cartilage is the common presence of a cartilaginous bridge between

No.	Operator and date.	Sex and age.	Duration of illness.	Complication	Tapped previously.	Situation of incision.	Quantity of pus evacuated.	Irrigation.
1	Hilsmann, 1844	M. 25	8 mos.	None	No.	4th inter-space, a finger's breadth from left edge of sternum.	About 1 quart; much more escaped within a few hours after operation.	No.
2	Langenbeck, 1850	Not given	Not given.	Gunshot wound and necrosis of ribs.	No.	Where 5th rib was absent.	Not given.	No.
3	Rosenstein, 1879	M. 40	28 days	Pleuritis.	Twice a few days previous with aspirator; pleura also tapped.	4th inter-space near sternum	Great quantity.	No.
4	West, 1882	M. 16	1 mo.	None.	Yes, three days previously.	5th inter-space in line of left nipple.	2 quarts.	Carbolic acid sol. 1 : 40
5	Partzevsky, 1882 (?)	M. 23	13 wks	Pleuritis.	Yes, twice.	4th inter-space.	Not given.	Salicylic acid sol.
6	West, 1883	M. 14	Not given.	Pleuritis, pneumonia, abscess of thigh, arthritis.	Not given.	Opened with bistoury from wound to evacuate supposed pleural effusion.	24 fl.oz.	Not given.
7	Savory (?), 1883 Reported by Brinton and Collings.	M. 9	7 wks	Abscess of shoulder and thigh, pleuritis, pneumonia; serum obtain'd from pleura at two previous tappings.	No.	5th inter-space in ant. line of axilla; through pleural cavity, which was opened because effus'n believed to be pleural.	24 fl.oz.	Yes, Condy's fluid.
8	Scott, 1883	M. 6	5 wks.	None.	Yes, with trocar one day previously; irrigation with carbolic acid solution, 1 per cent.	5th inter-space near apex beat.	Not given.	Yes, carbolic acid sol. 1½ p. ct.
9	Newman (or Stirling), 1885	M. 32	2 mos.	Typhoid fever; pleuritis.	Yes, aspirated 4 times; 5th time a silver canula for drainage; carb. acid sol. & tinct. iod. sol. for irrig. First aspiration 1 month previously.	3d left inter-space; incision made where fistula existed from canula which had been draining the sac for three days.	174 fl.oz. had been evacuated by the five previous tappings.	Tincture of iodine (B.Ph.) 1 : 10
10	Mikhailov, 1885 (?)	F. 35	About 3 wks.	Pleural, bronchial, and renal lesions.	Yes, two days previously	4th inter-space near sternum.	2 fl. lbs. ?	Boric acid sol.
11	Gussenbauer 1885 (?)	M. 13	Not given.	Acute osteomyelitis at shoulder (left).	Not given.	5th rib resect'd; open'd pericardium through pleural cavity because thought to be pleural effusion.	Not given.	Thymol solution.

Perma- nent drainage after incision.	Time of after- treat- ment.	Result.	Reference.	Remarks.
Yes, wound kept open by inserting probe.	Nearly 3 mos.	Recov- ery.	Ueber die Para- centese des Peri- cardiums. F. A. Hilsmann, Kiel, 1875. (Inaug. Dissert.)	The pericardium was opened behind the sternum, though the external wound was a short distance to left of sternum. As the sac was gradually drained its walls contracted and the pericardial opening moved to the left. In a few days the opening was 1½ inches to left of sternum and over the 4th rib. In order to empty the sac thoroughly when the external wound was dressed the patient had to bend over as if he was about to stand on his head.
Not given.	Not given.	Recov- ery.	Vorlesungen über Akiurgie B. von Langenbeck, Berlin, 1888, 449.	Patient had been wounded in a duel in which the bullet shattered five ribs. Necrosis had subsequently occurred and purulent pericarditis resulted.
Yes, two drainage tubes.	About 2 mos.	Recov- ery.	Berl. klin. Woch., Jan. 31, 1881, 62	Pleuritis apparently occurred after tapping and incision of pericardium.
Yes, with drainage tube.	5 mos.	Recov- ery.	Med.-Chirurg. Trans., 1883, 235.	Rod-shaped bacteria found in pus. Patient in good health nine years afterward. West believes that pericardial adhesions had occurred, but there was no evidence of this condition.
Yes, with drainage tubes. Not given.	30 hrs. 14 dys.	Death. Death.	London Medical Record, Feb. 15, 1883, 33. Brit. Med. Journ., Dec. 8, 1883, 1129; and Feb. 21, 1891, 404.	Autopsy showed cardiac hypertrophy with fatty degeneration, pleural adhesions, pulmonary oedema. At autopsy found extensive pericardial adhesions. [Case of a septic nature most probably. —J. B. R.]
Yes, with drainage tube.	15 dys.	Death.	St. Bartholomew's Hosp. Reports, 1883, xix, 271.	This patient is evidently the one referred to by West in Medico-Chirurgical Trans., 1883, as having been operated upon by Savory. Case was one of pyæmia. Autopsy showed no communication between left pleura and tract leading through it to pericardium because adhesions had occurred.
Yes, two openings an inch apart with drainage tube through both.	Not given.	Recov- ery.	New Zealand Med. Journ., July, 1891, 268.	
Yes, with rubber tube.	5 days.	Death.	Australian Med. Journ., July 15, 1885, 303.	First aspiration was done in 6th left interspace; second in 4th right interspace; in third and fourth aspirations no information as to point is given; fifth tapping done in 3d left interspace; incision. At autopsy a sinus found in 2d interspace leading from pericardium to the subcutaneous tissue. This was nature's effort to obtain a spontaneous opening for the pus. Author suggests to us that it may give a hint as to best point for tapping.
Yes, with drainage tube.	18 hrs.	Death.	Annals of Surg., Nov. 1885, quoted from Lond. Med. Record, Aug. 15, 1885, from native journal.	Autopsy showed cardiac dilatation with fatty degeneration, pleural and bronchial disease, and kidney lesions. Bacteriological examination of heart and pericardium was negative. Original in Med. Oboz., Moscow, 1885, xxiii, 475.
Yes, by stitching pericardium to edges of wound.	Not given.	Recov- ery.	Wiener med. Wochen., Nov. 22, 1884, 1403.	Small fistule remained when case reported.

No.	Operator and date.	Sex and age.	Duration of illness.	Complication.	Tapped previously.	Situation of incision.	Quantity of pus evacuated.	Irrigation.
12	Rouse (Dickinson's patient), 1887	M. 10	About 15 wks.	Gleueal abscess, pleuritis; abscess of finger; pleura tapped 12 times, serum obtained.	Yes, three times; last time one week previously.	5th inter-space right side close to sternum.	Not given.	No.
13	Underhill, 1887	F. 6	2 days.	Pyæmia; had periosteal abscess of tibia a few weeks previously; autopsy: abscesses in kidneys and pleura.	Yes, aspirated twice, last time five days before incision.	5th left inter-space close to border of sternum.	Over 10 fl. oz.	No.
14	Parker, 1888	F. 9	6½ wks.	Osteomyelitis of tibia and suppurative arthritis of knee.	Yes, four days previously.	4th inter-space along left border of sternum with resection of one inch of 5th costal cartilage.	"A large quantity" flocculent pus and lymph.	Yes.
15	Halsted (reported by Osler), 1890	M. 36	Over 3 wks.	Acute necrosis of nose; albuminuria; congestion of right lung.	No.	4th inter-space midway between nipple and sternum.	Over a quart.	No.
16	Delorme, 1890	M.	18 days.	Double pleuritis; empyema; operation.	No.	4th inter-space a little outside of internal mammary vessels.	Few drops.	No.
17	Davidson, 1890	M. 6	Over 4 wks.	Metatarsal necrosis; subperiosteal abscess 8th rib right side; empyema; pneumonia.	No.	5th inter-space.	8 fl. oz.	No.
18	Davidson, 1890	M. 6½	Nearly 4 wks.	Empyema; operated upon previously.	No.	4th inter-space 1 inch from left edge of sternum.	Several fl. oz.	No.
19	Teale, 1890 (Bronner's patient)	F. 41	31 dys.	Influenza, pneumonia. Empyema operated on previously.	No.	4th inter-space 1 inch from left edge of sternum.	Nearly 2 pints.	Yes, iodoform and glycerin, solutions of boric acid and carbolic acid.
20	Deaver, 1890	M. 24	18 dys.	Synovitis (?) of knee.	Yes, aspiration one day previously.	5th inter-space 3 in. from middle line.	Not much but 3xxvj removed by aspiration day before.	No.
21	Sievers, 1892	F. 22	5 wks.	Pleuro pneumonia, empyema on both sides; nephritis.	Yes, seven days previously with trocar.	3d inter-space 2 cm. to left of sternum.	Great quantity.	No.
22	Kette, 1894	F. 7	.....	Osteomyelitis of both tibias	Yes.	Resection of 5th rib for 5 centimetres.	½ litre.	Lysol solution 1/2 per cent.

Perma- nent drainage after incision.	Time of after- treat- ment.	Result.	Reference.	Remarks.
Yes, with drainage tube.	2½ mos.	Recov- ery.	Trans. Clin. Soc. London, 1889, p. 48; mentioned also in Holmes' Treatise on Surgery.	Case considered one of pyæmia. Patient lay on face at times to encourage drainage.
Yes, with drainage tube.	5 days.	Death.	Edinburgh Hosp. Rep., 1896, iv. 200.	Several hemorrhages from interior of pericar- dium. Autopsy showed that the bleeding probably came from granulation tissue, on inner surface of pericardium, probably the seat of septic emboli.
Yes, stitched pericar- dium to edge of wound.	Death occurred during irriga- tion im- medi- ately after in- cision.	Death.	Trans. Clin. Soc. London, 1889, xxii. 60.	Pus did not flow well; it was thick and contained membraniform shreds; hence irrigation was adopted. Operator believed death was caused by irrigating fluid collecting in pericardium, as opening in pericardium became plugged with lymph. Patient was pyæmic. No special lesion found at autopsy, except pericardial changes. As opening in pericardium became plugged with lymph pressure on heart proved fatal.
Yes, with gauze plug.	17 dys.	Death.	Univ. Med. Mag., vi. 248.	Great improvement after operation. Dr. Osler, who reports case, calls the pericarditis septic and attributes the fatal result to probable myo- carditis. No autopsy was made.
No.	Few mo- ments.	Death.	Revue de Chir., 1895, xv. 1008.	Patient died of asphyxia which had caused peri- cardial operation to be hurriedly undertaken. Autopsy showed front of heart adherent to peri- cardium, and about 500 grms. of sero-pus col- lected at base and sides of heart, and a great quantity of false membranes that could only have been removed by a large opening followed by washing and direct extraction. The open- ing in 4th space was over the adherent region.
Yes, with drainage tube.	7 days.	Death.	Brit. Med. Journ., March 14, 1891, 578.	Autopsy showed no pericardial adhesions; pneu- monia. Case was considered septic.
Yes, with drainage tube.	Over 7 wks.	Recov- ery.	Brit. Med. Journ., March 14, 1891, 578.	
Yes, with drainage tube.	26 dys.	Death.	Brit. Med. Journ., Feb 14, 1891, 350.	No autopsy made; but a probe passed into peri- cardium discovered no adhesions, though soft granulations were felt toward base of heart.
Yes, rub- ber tube.	13 dys.	Death.	Univ. Med. Mag., 1894, vi. 207.	Autopsy showed much fibrinous exudate within pericardium. [Case of a septic nature most probably.—J. B. R.]
Yes.	8 dys.	Death.	Zeitsch. für klin. Med., 1893, xxiii. 26.	Found bacilli in fluid. Autopsy showed acute nephritis, pleuro-pneumonia, pericardial adhe- sions, and some change in heart muscle. Peri- carditis was of a septic-pyæmic nature. Opera- tor chose 3d interspace because 4th and 5th spaces were very narrow.
Not given.	12 dys.	Death.	Verhand. d. Berl. med. Gesellsch. (1892), 1893, xxiii. 2.	Autopsy showed numerous foci of pus in fissures of cardiac muscle, in papillary muscle of mitral valve, and in kidneys; caseous mass in lung and evidences of plenritis were found. Pus evacu- ated contained staphylococci, streptococci, and bacilli. [Case evidently septic.—J. B. R.]

No.	Operator and date.	Sex and age.	Duration of illness.	Complication.	Tapped previously.	Situation of incision.	Quantity of pus evacuated.	Irrigation.
23	Eiselsberg, 1894	M. 17	Over 4½ mos.	Wound by knife in reg'n of heart had healed; left pleuritis and pneumonia followed third tapping.	Yes, three times.	Resection of 11th cartilage.	2 litres.	Yes, sol. of salicylic acid, then iodoform and glycerin
24	Edwards, 1892 (?)	F. 6	Not given.	Sacculated empyema; oper'n with resec. of ribs; mediastinitis—nephritis.	No.	1½ in. within and above position of apex beat.	3ix.	No.
25	Jacobson	F. 14	Not given.	(Edema of lungs.	Not given.	5th interspace right side a little outside of sternum.	3xlvj.	Not given.
26	Gabszewicz, 1892	M. 22	1 mo.	None.	No	Resection 5th costal cartilage.	Large quantity.	Yes, boric acid sol.
27	Robinson, 1893	M. 16	20 days.	Sore-throat; swelling of left wrist first symptom.	Yes, aspiration one day previously.	Resection of 6th rib.	2 quarts.	No.
28	Marsh	M. 14	Not given.	Not given.	Not given.	Below the nipple.	Not given	Not given
29	Klefborg	M. 19	.....	Influenza previously.	Yes, aspiration 150 grms. pus.	4th interspace.	1 litre pus.	.....
30	Bohm, 1894	M. 33	1 mo.	Influenza previously; pleuro-pneumonia.	Yes, three times.	3d interspace.	1 litre.	Yes, boric acid solution.
31	Allen, 1892	M. 41	Not given.	Empyema requiring costal resection one year before.	Yes, aspiration.	Resected 6th rib below and inside left nipple.	2 quarts.	Yes, with sterile water.
32	Stoker (O'Carroll's patient), 1892	M. 20	34 days.	Pneumonia; left pleural effusion subsequent to operation.	Yes, aspiration five days previously.	4th interspace midway between nipple and sternum.	Not given	No.
33	Rjorkman (or Hackzell), 1895 (?)	F. 12	About 3½ wks	Influenza and pleuro-pneumonia previously.	Yes, in 4th interspace.	Resection 5th and 6th ribs.	400-500. c. c.	Yes, boric acid solution.
34	Porter (Shattuck's patient), 1895	M. 26	33 days.	Pneumonia before pericarditis; empyema afterward requiring resection.	Yes, aspiration two days previously.	5th interspace 1½ in. to left of sternum.	1 quart.	Yes, with sterile salt solution.
35	Garber, 1897	F. 21	2 wks.	Pericarditis caused by penetrating wound with steel crochet needle.	Not tapped previously.	5th interspace 1½ in. to left of sternum.	About 1 fl oz. thick pus and also puru-sanguinolent fluid.	Yes; salt solution.

Perma- nent drainage after incision.	Time of after- treat- ment.	Result.	Reference.	Remarks.
Yes, two tubes.	About 6 wks.	Recov- ery.	Wein.klin.Woch., Jan. 10, 1895, p.21.	Drains kept in pericardium for seventeen days.
Yes, rub- ber tube.	Not given.	Death.	Trans. Med. Soc. of State of Cali- fornia, 1893, 166.	Began as mediastino-pericarditis with secondary pleurisy; at least this was the belief of Ed- wards after an autopsy.
Not given.	Not given.	Death.	Jacobson's opera- tions of Surgery, Lond., 1897, 590.	Death occurred from œdema of lungs.
Yes, by iodoform gauze for 18 days.	Not given.	Recov- ery.	Gaz. Lekarsk, Warsaw, 1892, 2 ser. 12, 1070.	
Drainage tube.	About 2 mos.	Recov- ery.	Lancet, Nov. 21, 1896, p. 1460.	
No.	4 days.	Death.	Lancet, Nov. 21, 1896, p. 1460.	
.....	6 days	Death.	Tidskrift i Mili- tar. Helsevord, 17 Arg. 1892, Stockholm, from Shattuck and Porter. Boston Med. and Surg. Journ., May 6, 1897, p. 444.	Autopsy showed pus in right ankle-joint and right sterno-clavicular joint. [Probably septic.—J. B. R.]
Gauze drain.	3 mos.	Recov- ery.	Deutsche med. Wochen., Nov.26, 1896, p. 769.	Schleich's infiltration method of local anæsthesia was used. Out of bed in four and a half weeks. Wound closed in three weeks; well a year later.
Gauze drain.	20 days.	Death.	Personal com- munication from Dr. D. P. Allen, Cleveland, Ohio.	
Drainage tube in- serted on 3d day.	30 days.	Death.	Dublin Journ. Med. Sciences, July, 1896, p. 11.	Frankel's diplococcus found in pus.
Yes, two large drainage tubes.	6 weeks	Recov- ery.	Hygeia, Stock- holm, lviii. pt. 2, p. 189, 1896.	Pleural cavity was opened during resection and some serum evacuated. The pleural opening was then sutured.
Two rubber tubes.	On 36th day wound entirely healed; empy- ema; sinus finally closed in about 10 mos.	Recov- ery	Boston Med. and Surg. Journ., May 6, 1897, p. 438.	Pneumococcus in pus; pneumothorax and em- pyema occurred after pericardotomy; then erysipelas of back and shoulder. Pneumococ- cus in pus from pleural sac.
Yes, with gauze.	24 days.	Recov- ery.	Journ. Amer. Med. Assoc., June 26, 1897, p. 1223.	

the sixth and seventh costal cartilages. This would complicate a little, though not to a great extent, the lifting up of the trap-door. Such a bridge sometimes occurs between the fifth and sixth cartilages.

Operators who have made similar resections of the chest-wall in operations for suppurative pleuritis have proved by skiagraphy that consolidation takes place if the perichondrium be retained. Restoration would certainly be much more probable in the operation which is here advocated, since not only the perichondrium but the cartilages themselves, with many of their connections, have been retained.

The evacuation of the fluid after opening the pericardium can be made complete at times by a change in the posture of the patient or breaking down adhesions by a probe or the finger introduced into the sac. It does not seem to be especially dangerous to allow the pus to flow out rapidly, but it is wise to permit the escape to be gradual.

Aspiration can be readily done under local anaesthesia by cocaine or freezing. Resection in the manner advocated will probably require general anaesthesia. If the severity of the symptoms renders general anaesthesia dangerous, it may be well to withdraw a portion of the fluid by the aspirator needle used for diagnosis in the xiphoid fossa, and delay drainage by incision and resection until the patient's condition will permit the administration of an anaesthetic. The patient should be allowed to remain recumbent or semi-recumbent during the operation. The tubes should be prevented from slipping into the pericardium by being stitched to the skin or having a safety-pin thrust through their outer ends.

Operations upon the pericardium for pyopericardium would seem, on general principles, to promise better results in a mechanical way than similar operations upon the pleura, for the pericardium is elastic and more easily drained than the pleura. If it becomes thickened and does not collapse after evacuation of pus, I would be inclined to incise any remaining fistule and cut away the thickened pericardial tissue.

Pericardial fistules should be treated as fistules elsewhere. After sufficient time has been given to make it clear that spontaneous healing will not occur, the fistule should be laid open and thickened tissue removed.

THE RÖNTGEN RAYS IN THORACIC DISEASES.¹

BY FRANCIS H. WILLIAMS, M.D.,
BOSTON.

ABOUT a year ago I had the pleasure of presenting to this Association a paper in which I related some of the early steps in my study² of the adaptation of the x-rays to medical practice; x-ray examinations were then a novelty, but they must now be accepted as a valuable supplement to our other methods of examination. To-day I wish to outline some of the results of the work of the past year, during which I have examined by means of the x-rays more than five hundred patients—about one hundred of which were surgical cases—at the Boston City Hospital and at my office.³ The majority of the four hundred medical cases were suffering from some thoracic disease; certain of these patients—those ill with pneumonia, for instance—have been examined a number of times, as I wished to watch the progress of the disease and see the conditions presented in its different stages.

No harmful effects have been received in any way by these patients, and there need not be the slightest anxiety on the part of any one if proper precautions are taken. I have seen, however, several persons who have suffered a more or less severe inflammation of the skin, the nails also being sometimes involved, but they were all individuals whose occupation brought their hands into close proximity to the Crookes tube, or who, for the purpose of testing its possibilities for harm, had exposed some part of the body to its action at a distance of a few inches for a considerable period; but there are simple ways of obviating these effects.

Before taking up the uses of the x-rays in diseases of the thorax, let me call your attention to one of the principles upon which their usefulness depends.

The varying resistance which the different tissues of the body offer

¹ Presented at the meeting of the Association of American Physicians, May 5, 1897.

² During the progress of this study I have reported my results at medical meetings or by published articles, as follows:

Meeting of the Suffolk District Medical Society, April, 1896.

Meeting and Proceedings of the Association of American Physicians, 1896: "Notes on X-rays in Medicine." Boston Medical and Surgical Journal, October 1, 1896, "A Method for More Fully Determining the Outline of the Heart by Means of the Fluoroscope, together with other Uses of this Instrument in Medicine."

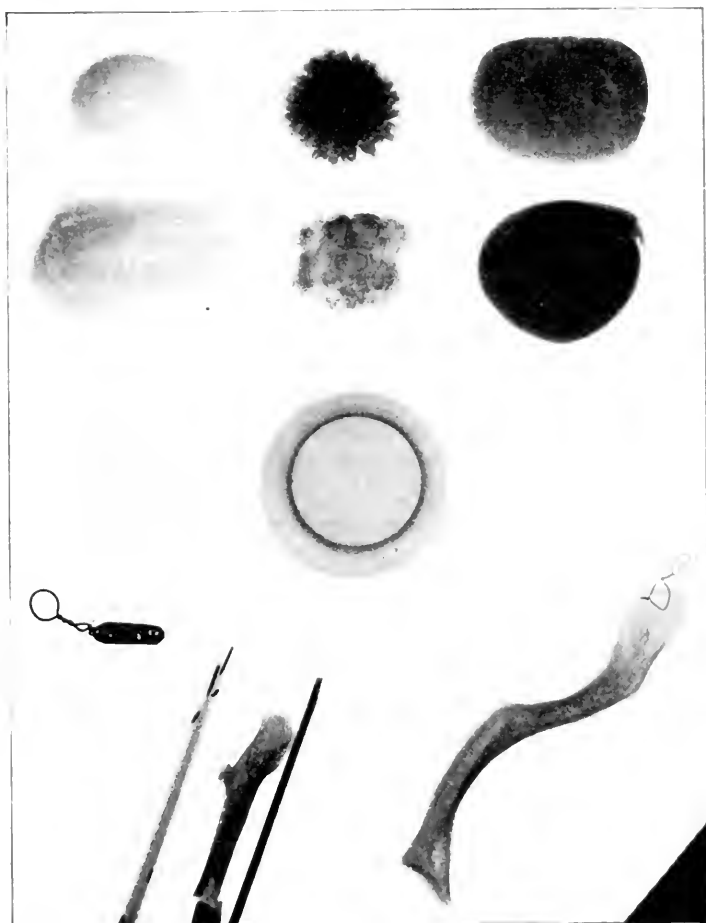
Meetings of the Boston Society for Medical Improvement, and of the Medical Society of the Boston City Hospital, October and November, 1896.

Medical and Surgical Reports of the Boston City Hospital, January, 1897, pp. 134-190. "A Study of the Adaptation of the X-rays to Medical Practice."

³ In making these examinations I have used a Wimshurst machine and an induction coil, but principally the former, both of which were designed by Messrs. C. L. Norton and R. R. Lawrence, of the Massachusetts Institute of Technology.

to the passage of the x-rays depends upon difference in bulk and in chemical composition; organic substances made up of carbon, hydrogen,

FIG. 1.



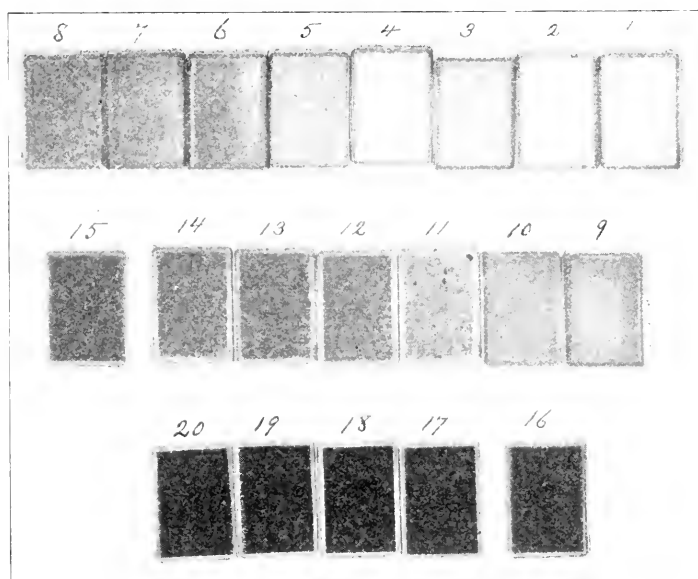
The two upper rows of objects in this radiograph are calculi. The two calculi on the left are composed of uric acid and urates; those on the right of phosphates; and the two in the middle of oxalate of calcium and uric acid, the upper one of these last two having an outside coating of urates. In the centre of the picture is a round aluminum cup, containing water, one inch in depth, and on either side of this cup is a group of gall-stones, and to the right and below the cup a single large gall-stone is seen indistinctly. In the left-hand lower corner is a decalcified bone, bent into the shape of an inverted v, with a lead tag attached by a copper wire. The decalcified bone surrounds an incinerated bone, which is lying on a piece of cotton-wool in a wooden box with a glass side. In the right-hand lower corner is a dry bone; in the extreme right hand corner is a triangular piece of lead. The picture is reduced to one-half of its original size.

and nitrogen, which have a low atomic weight, allow the rays to pass readily, while those like bone, containing calcium, which has a com-

paratively high atomic weight, offer more resistance to the rays. The soft tissues of the body contain a large percentage of water, and most of them offer about the same resistance as an equal thickness of water. The various fluids found in the body in health and disease, such as the blood, ascitic and pleuritic fluid, pus, urine, fluid from hydrocele, etc., offer about the same resistance as water.

The following experiment with calculi (see Fig. 1) illustrates in a striking manner how important to us is a knowledge of chemical composition in our use of the Röntgen rays in medicine. Before

FIG. 2.



Radiograph of equal bulks of various substances which represent the constituents of the body in a general way:

	Weight.		Weight.
1. Carbonate of magnesium	16 grammes.	5. Gelatin	4.0 grammes.
2. Stearic acid	3.8 "	6. Dried egg albumen	6.4 "
3. Oleic acid	3.5 "	7. Carbouate of sodium	5.9 "
4. Palmitic acid	4.4 "	8. Milk sugar	11.7 "
9. Glycerin	4.0 "	13. Phosphate of calcium	2.6 "
10. Water	14.0 "	14. Sulphate of sodium	10.8 "
11. Oxalic acid	12.2 "	15. Magnesium ammonium phos- phate	12.5 "
12. Phosphate of sodium	10.6 "	16. Chloride of sodium	8.5 "
17. Sulphur	13.9 "	19. Carbonate of calcium	15.3 "
18. Chloride of potassium	10.1 "	20. Fluoride of calcium	11.7 "

attempting to detect any form of calculi in the body I first placed several different kinds over a photographic plate, which was enclosed in dark

paper to shield it from the light, and exposed them for a few minutes to the x-rays. The rays penetrated the calculi made up of uric acid, of cholesterine and biliary salts very readily, but were obstructed by calculi containing oxalate of calcium in considerable proportion, phosphate of calcium, or other inorganic constituents. These calculi were kindly lent to me by Dr. William F. Whitney.

In order to gain some conception of the susceptibility of the various constituents of the body to the x-rays, I made several radiographs of a considerable variety of substances (see Fig. 2), and one of them I have had reproduced here.

This experiment suggests how we may recognize some changes in chemical composition made in the body by pathological processes. The ability to do this without beaker or reagent, or disturbing the vital processes, is a step in the application of chemistry and physics to practical medicine which hints at what the future may have in store for us.

There is one other point which must not be overlooked in this connection, and that is the difference in resistance which air and water offer to the passage of the x-rays. The rays pass through air much more readily than through water, and, as air makes up a certain bulk of the body and a large part of the chest is filled with it, while water enters into the composition of all parts of the body and forms the chief constituent of the soft parts, it is readily seen of how much importance is this difference in permeability of air and water by the rays, on account of the great contrast which is thereby afforded in health between the lungs and their adjacent tissues or organs. Further, as will be shown later, one of the best opportunities for the advantageous application of the x-rays is obtained from the contrast of the normal lung tissue with that offered by pathological conditions which occur in the thorax, involving chiefly increase in density in the lungs or in the space usually occupied by them.

To use the Röntgen rays successfully in practice it is first essential that the physician become familiar with the appearances in the fluoroscope which present themselves in health by examining a number of healthy persons of different ages and weights. This applies particularly to the thorax, and the picture of this part of the body, when seen on the screen of a large fluoroscope, presents so much that it should be studied systematically. The trunk appears lighter above than below the diaphragm, and the rise and fall of this muscle, which is dark in the fluoroscope, are distinctly seen. The chest is divided vertically by an ill-defined dark band, which includes the backbone, on each side of which the lungs, forming the brightest part of the picture, are crossed by the darker ribs; this band varies in width according to the intensity of the light, narrowing as this becomes stronger; with a strong light the vertebrae from the neck to the heart are made out. The pulsating heart is

seen, especially the dark ventricles, the outlines of the venæ cavae and of the pulmonary artery, and under favorable conditions the lighter right auricle. A small portion of one side of the arch of the aorta may be observed in the first intercostal space to the left of the sternum. After this general view has been taken the outline of the lungs should be noted during full inspiration and expiration, and the excursion made by the diaphragm during quiet breathing and during full inspiration and expiration (see Fig. 3).

FIG. 3.

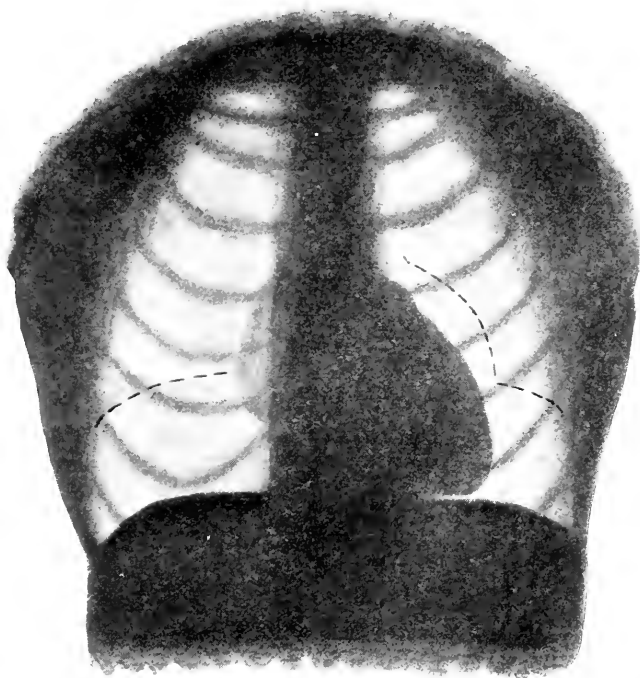
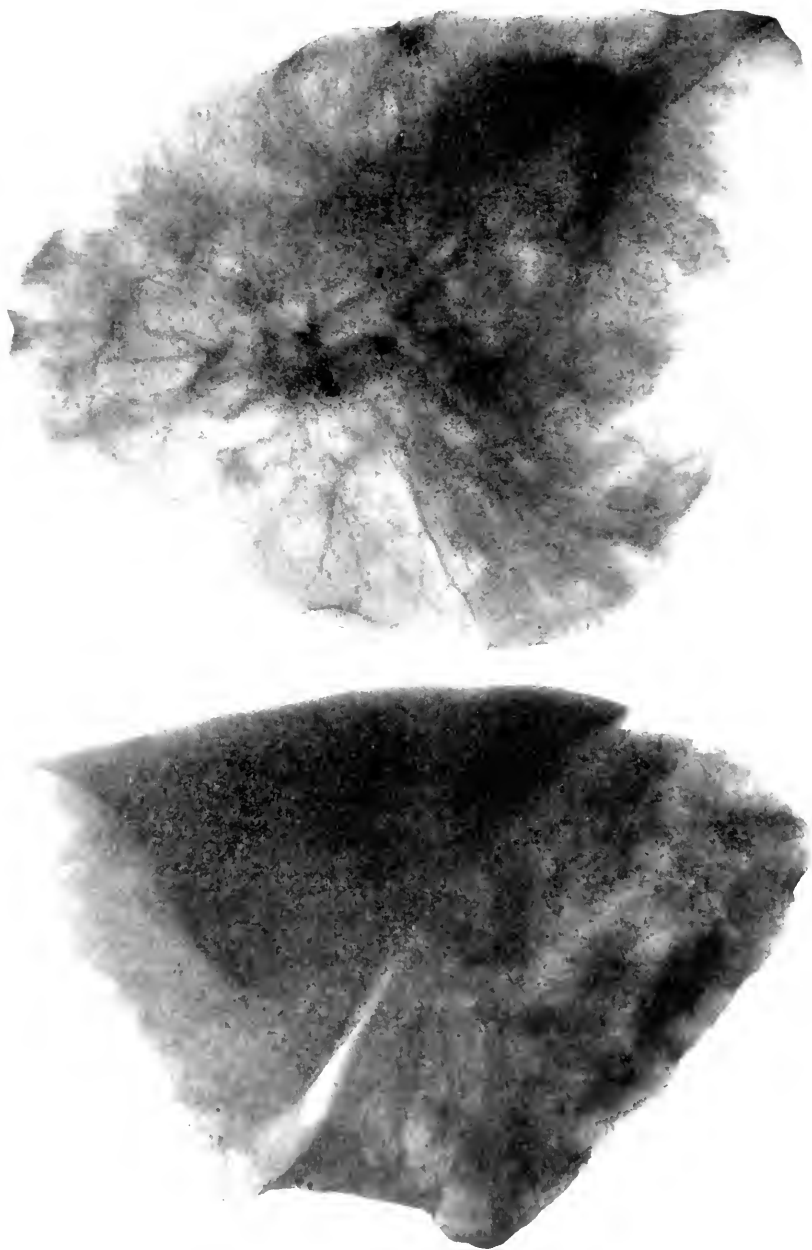


Diagram showing the heart and the outline of the diaphragm of normal chest, as seen in the fluoroscope during full inspiration. The broken lines show position of heart and diaphragm in expiration.

The lungs usually appear brighter during deep inspiration; in young persons brighter than in older persons, as the tissues of the former are more easily penetrated by the rays. In the stout, the lungs appear darker than in the thin, because the outlines are dulled, as it were, by a thicker layer of tissues, which contain much water. It has seemed to me that the right apex is normally darker than the left apex. The normal brightness of the lungs and the normal outlines of the clavicles and ribs should be observed, for, as we note different degrees of pallor by reference to our standard of color in health, in the same way is it

FIG. 4.



The lungs of a patient who died of pneumonia. The lightest portion is healthy. The darker parts have been more affected by the pneumonic process than the lighter.

necessary to know the normal amount of light which should penetrate any given part in order to recognize variations from the normal. The eye must be trained in the use of the x-rays as is the ear for auscultation and percussion, and the fluoroscope, like the ophthalmoscope, should be in constant use in order that the practitioner may not lose any of the skill acquired in interpreting the conditions presented.

To test the possibilities of an examination with the fluoroscope in certain conditions of the lungs, as when congestion or more or less cedema or pleurisy was present, I made one or two simple experiments. On full inspiration in healthy patients I found the pulmonary area lighter than in other stages of respiration, and the ribs stood out in greater contrast, thus showing that there must be less blood in the lung during the former period, and that if any part of the lung is much congested, or if cedema is present, it would naturally appear darker than the normal lung; also when I held a small pasteboard box, about one-half inch deep and full of water, over one side of the thorax of a well-developed and muscular man with a large chest, I could see its shadow in the fluoroscope during about full inspiration, but not at other times.

In order to get further suggestions in regard to the possibilities of the x-ray examinations in diseases of the lungs, I took a number of radiographs of healthy and diseased lungs just after death, which were removed from the body and put over a photographic plate. As a specimen of the latter, see Fig. 4, which shows the lungs of a patient who died of pneumonia. The darker was more affected by the process than the lighter; the lightest portion is healthy. These lungs were kindly sent to me for a few moments by Prof. W. T. Councilman.

Again I examined with the fluoroscope, two days before his death, the chest of A. B., one of my patients who died of syphilis, and found his lungs perfectly clear and the outlines well defined. The outlines, also, of the front and back portion of the ribs forming a lattice-work, as shown in the fluoroscope, were well seen. The autopsy confirmed the examination made by the fluoroscope, and showed that he had perfectly healthy lungs.

We shall see presently that in certain diseases parts or the whole of one or both lungs appear darker or lighter than in health, and that their volume may be greater or less than in health. The respiratory excursion of the diaphragm may vary from the normal on either or both sides of the chest, in position—that is, it may be higher or lower in the body, and in amplitude, or it may vary in the curve, or its lines may be wholly or partially obliterated.

In making examinations of the lungs, changes in the amount of light seen in the fluoroscope should be carefully observed: for example, whether or not one lung is darker than the other. In pathological conditions the indications of change in density, shown usually by dimin-

ished brightness, may be estimated by comparing the two sides and observing whether the outlines of the organs and whether the ribs and clavicles are more clearly seen on one side than on the other. When both sides are diseased the opportunity for direct comparison with the normal is lost, and one is obliged to depend upon the recollection of the normal in an individual of the same build. The position, excursion, and curve of the diaphragm should also be carefully noted, as compared with the normal.

In six men with healthy lungs the diaphragm moved over an average range of two and three-fourth inches on the right side and two and one-half inches on the left side. (See Fig. 5.) The maximum excursion in any healthy person I have examined was four inches. In eighteen patients with tuberculous lungs the average excursion of the diaphragm was one and one-fourth inches; in some cases less than half an inch.

FIG. 5.

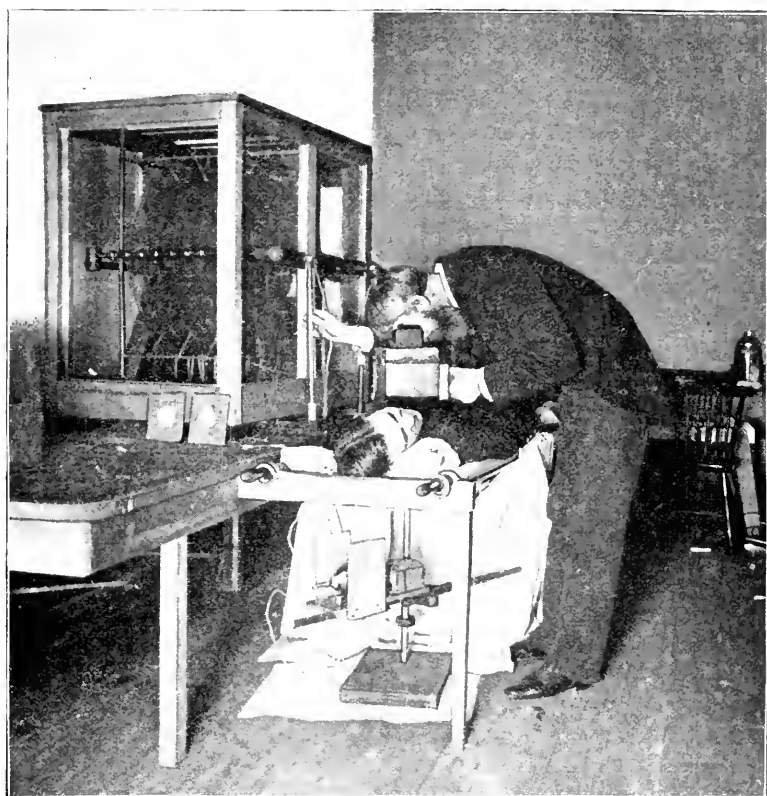


Chest of healthy man, aged twenty-one years. Examination with the fluoroscope: The dotted lines on each side of the chest indicate the outlines of the fourth rib; the full upper horizontal lines on either side of the chest about over the fourth rib, the position of part of the diaphragm in expiration; the broken lines just below these, the height of the diaphragm at inspiration during quiet breathing; the full lines below and parallel to these, the outlines of the diaphragm during deep inspiration. The full curved line which is nearer the left nipple indicates the left border of the ventricle during quiet breathing; the full curved line nearly parallel to this, the left border and apex during deep inspiration.

Patients may be examined standing, sitting, or lying down, with the rays passing through the body antero-posteriorly or from side to side. Most of my examinations have been made with the patients lying on a

stretcher (see Fig. 6), and the Crookes tube on an adjustable holder under the patient. For careful examination of the thorax, for example, the Crookes tube should be about two feet away from the fluoroscope.

FIG. 6.



Showing method of examining a patient who has been brought into the dark-room on the stretcher, on which he lies. The Crookes tube is on an adjustable holder below the patient; the static machine on the table near him. About two inches below the patient there should be a brass plate (not shown in the figure), rather more than a foot square and one-quarter of an inch thick, with a circular opening about six inches in diameter. This plate is attached to a flat iron bar in such a manner that it may be swung horizontally and brought under any part of the body it is desired to examine carefully. The rays pass only through the circular opening, and the part to be specially examined is thus more clearly defined. This metal diaphragm is used after the general examination of the body has been made without it. The plate should be grounded.

and its position should be determined by plumb-lines, so as to bring it immediately under the middle of the sternum, on a level with the fourth rib. The fluoroscope is peculiarly applicable to moving organs, such as

the heart and lungs, and is useful in examining children. I now use this instrument in my office as I do the stethoscope.

Let us now take up individually some of the thoracic diseases, and we will first consider pulmonary tuberculosis.

PULMONARY TUBERCULOSIS.

In this the fluoroscope may suggest disease in the following ways: First, a diminution in the volume of the diseased lung is shown by the position and movement of the diaphragm; this movement may be less than normal on one or both sides, and will be restricted on the lower

FIG. 7.

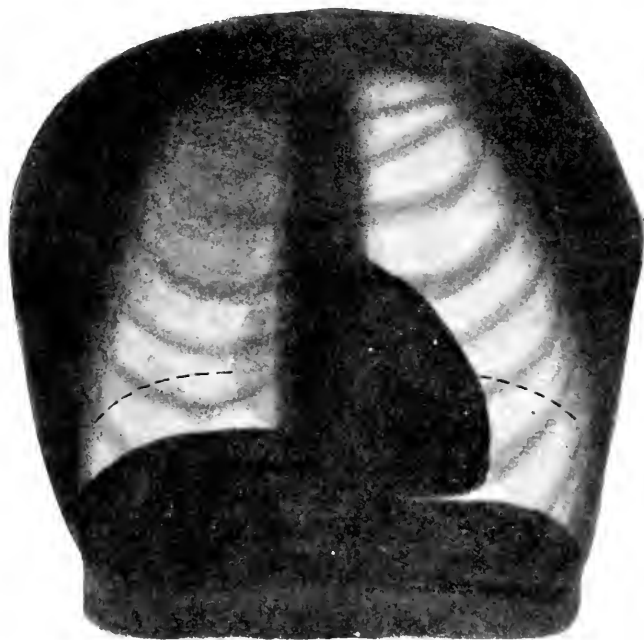


Diagram illustrating appearances seen in the fluoroscope in a case of tuberculosis of the lung. The apex of the right lung is seen to be darker than normal, and the range of movement of the diaphragm on the right side to be less than normal. The position of the diaphragm in full inspiration is shown; broken lines give its position in expiration.

side. Second, an increase in density by diminution in the normal brightness, the degree and extent varying in accordance with the increase in, and extent of, the density. The lung may become so dense that no more rays pass through it than through the liver. The brightness or light in the lungs indicates the amount of air in the chest. The diaphragm lines may be partially or wholly obliterated, as well as the outline of the heart.

I have examined more than one hundred cases of tuberculosis¹ with the fluoroscope, and found a correspondence between the physical signs and the x-ray examination in a considerable number of cases; in certain cases this instrument showed that the disease was more extensive than the physical examination indicated; *in others it showed increase in density in the lungs earlier than was detected by the physical examination; and while in some of these no signs in the lungs were detected prior to those found by the fluoroscope, in others, although one lung was ascertained by the physical examination to be seriously involved, its companion was not suspected until the x-ray examination revealed its increased density.* In most cases of pulmonary tuberculosis the fluoroscope enables us to estimate the amount of lung involved better than any other method of examination. Most of the tuberculous patients that I examined at the Boston City Hospital presented well-marked signs of the disease when they entered, but in private practice the proportion of patients who are seen in the early stage, when there is greater opportunity for successful treatment, is larger; and therefore the fluoroscope might be of special value in these cases on account of the earlier diagnosis it assists us to make.

The following case, which one of my colleagues kindly permitted me to examine with the fluoroscope, shows that this instrument detected increase in density in the right lung when it was not found by auscultation and percussion. It likewise indicates the significance of the diaphragm lines in tuberculosis:

H. A., aged twenty years. Tuberculosis(?). Duration, four weeks: family history not tubercular. Medium dry râles at left apex, with slight dulness; *right apex normal.*

Examination with fluoroscope: Left lung extending to level of the fourth rib very dark; *there is also some involvement of right apex.* The maximum respiratory movement of the diaphragm on the left side is only three-quarters of an inch; *on the right side one inch only.* This is less than half the normal.

[Later tubercle bacilli were found.]

Let me also give the following case in which increase in density was detected earlier by the x-ray examination than by the older method. I examined this patient because he had a pericardial effusion, but the increase in density at the apex of the right lung was so marked in the fluoroscope that it attracted my attention. The usual physical examination was then made, but I could find no evidence of pulmonary tuberculosis. I examined the lungs by the fluoroscope from week to week, and saw that the denser, diseased area extended, while the movements of the diaphragm became less and less on that side. After about six

¹ See "A Study of the Adaptation of the X-Rays to Medical Practice," Medical and Surgical Report, Boston City Hospital, January, 1897, pp. 153-165, for short abstracts of some of these cases, as well as those of pneumonia, etc.

weeks the fluoroscope showed that the left lung also had become denser at the apex, and the excursion of the diaphragm on this side was also lessened. No signs were found by auscultation and percussion on this side at this time. There has been no cough, the patient is about as usual in weight, has no night-sweats, and no bacilli have been found; but about two months after his entrance to the hospital he reacted very strongly to tuberculin, and the diagnosis of tuberculosis was established. Four months after entrance: still no bacilli have been found, although many examinations for them have been made. There are, however, some cases where the bacilli are found before marked signs in the lung can be detected by the fluoroscope; it may be that in these cases the disease begins in the larynx.

Again, a woman twenty years old, unusually well developed and nourished, entered the hospital with phlebitis of the leg. Two of her sisters had died of tuberculosis. By auscultation and percussion the heart's area, action, and sounds were normal; resonance and respiration good over the whole of both lungs. After she had been in the hospital two weeks an x-ray examination was made, chiefly because I had established the routine of so examining many of my patients. This examination showed that the maximum movement of the diaphragm on the right side was one and seven-eighths inches, and on the left side two inches. The apices of the lungs were darker than normal on both sides, more so at the right apex than at the left. The outline of the heart showed that this organ was smaller than normal. Tuberculin was given and was followed by a typical and well-marked reaction. The tubercular family history, diminished movement of the diaphragm, increased density of the apices of the lungs, and the small heart, all pointed to the diagnosis of tuberculosis, and this was confirmed by the tuberculin-test. As yet there have been none of the ordinary symptoms or signs of disease of the lungs, except those seen in the fluoroscope.

We can detect an abnormal condition of the lung in some cases of tuberculosis earlier by means of the fluoroscope than by auscultation and percussion. How much earlier these signs can be anticipated depends upon the rapidity of the progress of the disease, and this varies in different persons and under different conditions. Of course, a diagnosis of tuberculosis is not made by the appearances in the fluoroscope alone, they simply indicate an abnormal condition of the lungs. I shall consider more fully the use of the fluoroscope in pulmonary tuberculosis in another article.

PNEUMONIA.

I have examined more than fifty patients with pneumonia by the fluoroscope, and some of them, as already stated, a number of times while watching the progress of the disease, and found in a few cases that the

lung had not become normal after months. In patients ill with pneumonia the increase in density in the lungs is very marked in the fluoroscope during the active stage of the disease [Fig. 4 suggests the distribution of the darker areas as seen in the fluoroscope], and by its means we may estimate how large an area of the lungs is involved, and by observing the patients at intervals of two or three or more days, as they improve, we may see the dark areas become lighter and lighter, and finally disappear; and we may see the excursion of the diaphragm, which has been restricted and restricted on the lower side, become gradually longer as the lungs clear up. I have examined patients while they were convalescing from pneumonia, both by auscultation and percussion and by the fluoroscope, on the same day, and while by the former I could not detect that the lungs were denser than normal, I was able to recognize the continued presence of abnormal density by means of the fluoroscope, and even when this was no longer possible I could still easily see by means of this instrument that the diaphragm did not descend to its normal limit, thus showing that the lung was still in an abnormal state. Later the normal limit was reached. This method of examination enables us to judge better than any other when the lungs have cleared up after an attack of pneumonia, and if we can obtain, by means of the fluoroscope, later evidence of the presence of a pathological process during its subsidence than by auscultation and percussion, we may also reasonably expect to recognize its onset sooner, and I am satisfied that we can. Further, this ability to detect that the lungs are in an abnormal state weeks after a physical examination has ceased to indicate it, shows the delicacy of the test, and is an added assurance that we can in some cases of tuberculosis recognize an abnormal condition of the lungs earlier by means of the fluoroscope than by auscultation and percussion. A slight central pneumonia is at times overlooked when its early detection by the fluoroscope might, in certain cases at least, prevent its progress to a more severe attack.

During the past winter I have seen three patients where the diagnosis would have been difficult had not the fluoroscope led to that of central pneumonia; one of these cases was seen by three physicians, and we all failed to make the diagnosis. The examination with the fluoroscope caused me to make a diagnosis of central pneumonia, and the further progress of the case confirmed it.

The following case shows the significance of the diaphragm lines in pneumonia:

L. B., aged nineteen years. Pneumonia. Examination with fluoroscope: On seventh day of disease, right lung dark from middle of first intercostal space to fourth rib; the upper and lower border of this dark area were marked; outlines in chest rather less clear than normal on both sides. Diaphragm moved one-quarter inch on right side, and one

and five-eighths inches on left side. Fifteenth day of disease, diaphragm moved one inch on the right side; two and one-half inches on left side. Nineteenth day of disease, diaphragm moved two inches on right side; two and three-quarter inches on left side; original dark area on right side not so bright as other portions of the lung. On the twenty-second day of the disease, diaphragm moved two and one-half inches on right side and three inches on left side.

The abnormal condition of the lungs in tuberculosis and pneumonia may be shown not only by the obstruction which the affected parts offer to the passage of the rays, but also by the restriction of the excursion of the diaphragm. In some cases the latter is a more delicate test.

PLEURISY.

In pleurisy with effusion we can estimate the amount of fluid in a general way by the amount of light which passes through the thorax, and can follow the subsidence of the fluid. When the effusion is large no more rays pass through it than through the liver, and the outlines of the diaphragm, ribs, and heart are obliterated on the side of the effusion. If there is a smaller amount of fluid, the outlines of some of the upper ribs are seen, and with a small effusion the outlines low down in the thorax only are ill defined. The fluoroscope assists us to distinguish between an effusion and a thickened pleura. In some cases of effusion the fluoroscope shows us displacement of the heart, to the left when there is a large effusion on the right side and a much greater displacement to the right, and this displacement is of more frequent occurrence when the effusion is on the left side. This displacement of the heart to the right may not be recognized by percussion even when it has been pushed much beyond its normal place. In one patient the heart was seen to be displaced more than two inches to the right, but no displacement was detected by percussion. While examining some cases of pleurisy with effusion by the fluoroscope, I have found indications of tuberculosis in the lung where it was not previously suspected, and these indications were confirmed later by finding the bacilli or by the tuberculin-test.

EMPHYSEMA.

In emphysema we see in the fluoroscope that the lungs are unnaturally clear and that their volume is increased; the dilated right auricle and pulmonary artery are observed, and the whole enlarged heart is seen more clearly than normal, although by percussion its true outline cannot be determined; it is also seen to lie lower than in health, and in the later stages in a more vertical direction. The diaphragm is seen to be lower than normal, and the excursion which it performs between deep inspiration and expiration to be less than normal. In some cases the emphysematous condition may be greater on one side than on the other.

The lower position and the more limited excursion of the diaphragm give a means of making a diagnosis of this condition probably earlier than has hitherto been possible, or in some cases the lack of these signs enables us to exclude it.

FIG. 8.



Emphysema. Dotted line marks cardiac area by percussion; full line, by fluoroscope. Diaphragm lines, in expiration and inspiration, are shown on each side of chest below the nipple; they are lower and nearer together than normal. Broken line below inner end of left clavicle shows position of arch of aorta.

The following case was sent to me with a diagnosis of emphysema with asthma:

B. F. Examination with fluoroscope: Diaphragm moved on the right side two and one-half inches, and on the left side three inches. The excursion of the diaphragm being normal assures us that no serious amount of emphysema is present.

I have seen patients, both young and old, who complained of getting out of breath on exertion, and the cause in some cases would have been obscure but for the fluoroscope; this instrument showed that the dyspnea in both young and old was due in some instances to emphysema, and in others to œdema of the lungs.

If some other disease is associated with emphysema, as, for instance, some form of bronchitis, the excursion of the diaphragm is characteristic, but the abnormal clearness of the lungs may be wanting.

BRONCHITIS.

The appearances of bronchitis in the fluoroscope vary; they may differ very little from those in health, or both sides of the thorax may

be less bright than normal. The respiratory movement of the diaphragm was not especially impaired in the cases I have seen.

PNEUMOTHORAX—HYDROTHORAX—PNEUMOHYDROTHORAX—
PNEUMOPYOTHORAX—ŒDEMA OF THE LUNG.

In pneumothorax the fluoroscope shows that the affected side of the chest is lighter than normal, that the heart and vessels may be much displaced, and that the diaphragm is much lower than normal on that side, and has a characteristic curve.

In pneumohydrothorax or pneumopyothorax, when the patient is examined lying down, the whole of the affected side of the chest is seen to be dark; if examined in a sitting position the upper portion of the chest is clear and the lower dark. The appearances remind one of a tumbler half-full of ink; when the patient bends forward or backward the height of the fluid on the chest-wall changes; if the patient is shaken gently the surface of the dark fluid is seen to be agitated. In pneumohydrothorax or pneumopyothorax on the left side the surface of the fluid is seen to be disturbed by the pulsations of the heart.

In hydrothorax and œdema of the lungs the fluoroscope is also of service. In these conditions, as well as in empyema, the outlines of the diaphragm are wholly or partially obliterated. Some partial œdema of the lungs is, I am inclined to believe, a more frequent condition than has been supposed. On first examining a patient of this class, his condition being unknown, I was surprised to find how difficult was the passage of the rays, and when I saw that the picture of the patient's thorax in the fluoroscope was unusually dark, supposed something was wrong with my Crookes tube; but after trying another I realized that the patient's chest was denser than normal; the tube was not in fault. I have examined a number of cases which illustrate the aid the fluoroscope renders in congestion or œdema of the lungs; this instrument showed that one of these conditions was present when it was not made out by physical signs, and it thus assists the physician to recognize the interference that may occur in the pulmonary circulation in cardiac or renal disease.

I have found it instructive to study, by means of the fluoroscope, cases of dyspnoea on exertion, and note the amount of congestion or œdema of the lungs present in them. Cases of this kind have already been referred to under emphysema.

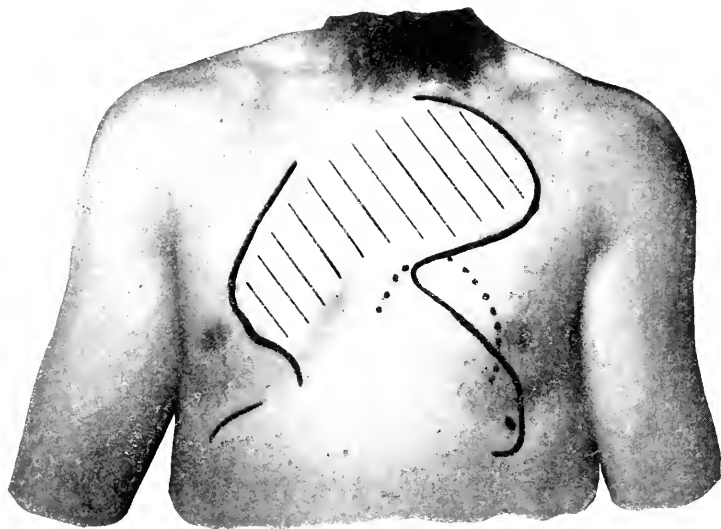
H. E., aged twelve years. Entered the hospital with an old endocarditis following rheumatism. There was a systolic souffle at the apex of the heart transmitted to the axilla; enlarged heart; orthopnoea, œdema of the lungs, and intense dyspnoea. Digitalis given. Three days after entrance examination with the fluoroscope showed that the lungs were denser than normal below the second rib on the right side,

and the third rib on the left side. Four weeks later, second examination with fluoroscope: Lungs perfectly clear, heart smaller. The patient had been up and about for some time.

ANEURISMS.

I have examined with the fluoroscope and taken radiographs of one subclavian and several thoracic aneurisms. The heart in some of these latter cases was much displaced. Aneurisms of the arch of the aorta are most clearly outlined when their borders are nearest the fluoroscope; those on the left when examined from the back, those on the right when examined from the front. It is obvious that aneurisms of the thoracic aorta can sometimes be detected earlier by x-ray examination than in any other way. In obscure thoracic cases, where an aneurism of certain portions of the aorta is suspected but does not exist, it may be excluded by an x-ray examination.

FIG. 9.



Thoracic aneurism. Examination with fluoroscope: The curved line in the upper part of patient's left chest, and the curved line on his right chest indicate the outline of the aneurism as seen in the fluoroscope. The lower curved line on the left chest marks the outline of the heart; the lowest curve on the right front, part of the outline of the diaphragm; the dotted line, the cardiac area as determined by percussion. This case shows how a large aneurism may exist in the chest without giving rise to marked physical signs.

I have recently seen in consultation a patient who had had excellent advice in Boston and New York, as well as elsewhere, and the diagnosis was obscure until my x-ray examination showed an aneurism of the aorta. In another case my x-ray examination showed that there was no aneurism where it was thought to exist.

FIG. 10.

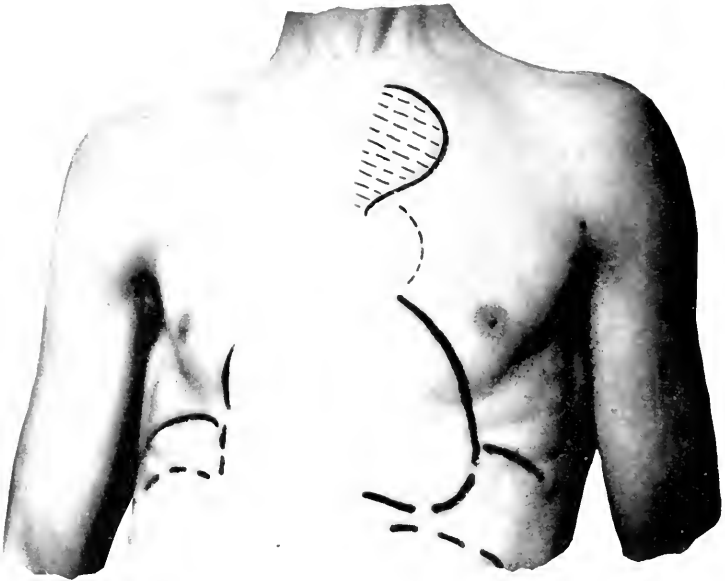
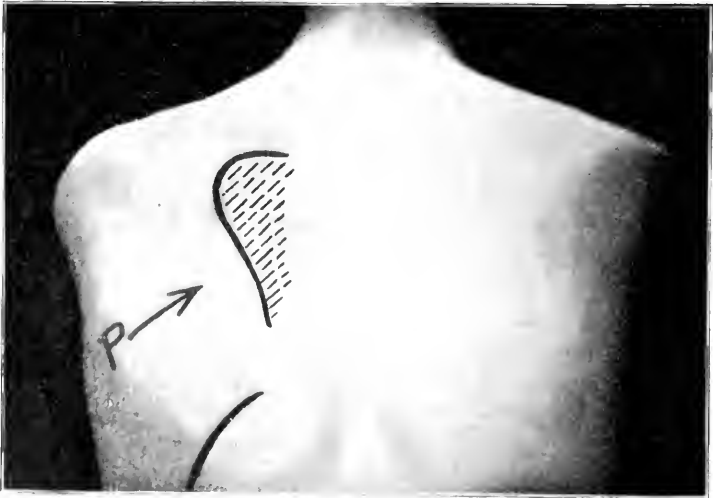


FIG. 11.



Figs. 10 (front) and 11 (back) show a smaller aneurism of the aorta. The arrow in Fig. 11 points to where the pulsation was best seen.

THE HEART.

Let us now consider the position, size, and movement of the heart in health as shown by the fluoroscope, before taking up some of the applications of the x-ray examinations in cardiac diseases. The best view of the heart is obtained during full inspiration, as then the diaphragm is so depressed as to expose a much greater part than during quiet breathing, and with more air in the lungs the outlines of the heart stand out better on account of the greater contrast thus produced. On the left side of the sternum the objects seen most clearly are a considerable part of the ventricle, including the apex, and the pulmonary artery; on the right of the sternum the right auricle, from about the second to the fourth rib, and the venæ cavæ; the right auricle and the venæ cavæ are not so dark as the ventricles, as they are not so thick.

When the space occupied by the lungs is in a normal condition the outline of the portion of the heart on the left of the sternum can be followed by means of the fluoroscope with more certainty, accuracy, and more fully than by percussion. The lower border of the heart near the apex is not obtained by percussion, but part of it is seen in the fluoroscope during deep inspiration. Also, on the right of the sternum the position and size of the right auricle, although it is not distinctly outlined, can be better ascertained by the fluoroscope than by other means; likewise the right border of the bloodvessels, which are much more marked in the fluoroscope than the right auricle; but the right border of the ventricle, being behind the sternum in health, is then better determined by percussion than by the fluoroscope.

The position of the heart varies in health in different persons. With deep inspiration it moves downward and toward the median line nearly an inch. While watching the pulsations of the heart in the fluoroscope I observed that the most marked changes in the outlines were not at the apex, but at the left side at the point corresponding to the cavity of the ventricle, the maximum pulsation being about where the outline of the ventricle crosses the fourth rib. I could see the ventricle contract and expand as it emptied and filled.

The change in the position of the heart, due to conditions outside of itself, such as pleurisy with effusion, pneumothorax, emphysema, etc., may be seen in the fluoroscope, as already stated, or the change in position due to its own enlargement. We may also recognize, for example, enlargement of the ventricles and see a dilated right auricle and pulmonary artery, and pulsations in the venæ cavæ. Differences in size may likewise be observed, for instance, the diminution which is found in anæmic patients with tuberculosis, or increase in size which takes place in hypertrophy or dilatation. The ability to observe such changes

as the above enables us to obtain a more accurate knowledge of the condition of the heart in disease than has hitherto been possible.

The so-called apex-beat, which physicians use so much as a point of reference in examining the heart, is not the apex-beat in all cases, but sometimes an impulse given by the side of the ventricle; the apex of the heart is then seen in the fluoroscope to be lower down, usually much below the point where the impulse is felt on the wall.

Calcareous deposits may be seen in some cases, but at present only when the disease is unusually well marked. In one of my patients I saw a dark area in the aorta, and in portions of the heart contiguous to it, which were pushed over to the right of the sternum. The autopsy showed that this dark area seen in the fluoroscope was a calcareous deposit.

The fluoroscope assists us to make a differential diagnosis between a pericardial effusion and an enlarged heart. Not only are the outlines seen to be different in the two cases, but in pericarditis with much effusion the characteristic pulsations of the heart are not seen.

In some diseases of the heart its outlines, to the left of the sternum, as found by percussion, are not correct. In order to compare the size and position of the heart, as obtained by this method and as seen in the fluoroscope, I drew on the skin the cardiac outlines found by percussion, and directly afterward these outlines as seen in the fluoroscope. I have done this in about thirty cases. Both sets of outlines were then traced on tracing-cloth, held carefully over the skin, the one in red and the other in blue lines. (In other patients I photographed the two sets of lines.) Comparison between these lines showed that in some cases the outlines obtained by the two methods, namely, by percussion and by the fluoroscope, agreed very well; in others the difference was marked. It should be stated, however, that although percussion does not indicate in some cases the true size and position of the heart, a proper examination of this organ with the fluoroscope is difficult to make, needing careful adjustment of the x-ray apparatus and experience with a considerable number of cases.

I have used several methods for recording the outlines of the heart seen in the fluoroscope; one record is made by means of a flexible, fluorescent screen which has a smooth surface like a porcelain slate. The screen is placed on the chest of the patient, the room is darkened, and the outline traced with an ordinary lead-pencil. These lines may be afterward rubbed out with a moist sponge and the screen used again. Another method, alluded to above, and one which allows of a ready comparison of results, is to draw the outlines of the organs on the skin by means of a special pencil, while looking through the fluoroscope, and then to place a piece of tracing-cloth, about a foot square, on the chest, and trace upon it the outlines that have been made on the skin. It is well in

these tracings to include the sternal notch, the nipples, the fourth rib, the ensiform cartilage, and the border of the ribs on either side and below the latter, as these serve as points of reference and comparison. Care must be taken that the tracing-cloth be held smooth and that the skin be not moved or stretched. These cloth tracings may be placed one over another and readily compared, as, for instance, the abnormal with the normal, or the size and shape of the heart in different diseases or in different stages of the same disease.

In the mediastinum new-growths or abscesses may be expected to give evidence in the fluoroscope of their presence by displacing the vessels and changing the normal outlines of the latter before they are large enough to be themselves seen by means of this instrument.

I wish to point out the advantages that may follow a study of carefully made radiographs. I have taken radiographs that indicate, for example, adipose tissue, the outlines of muscles, tendons, and arteries in healthy persons, both children and adults. Possibly we may by this means obtain useful clinical information as to the condition of the arteries in arteriosclerosis before it is recognized in other ways.

SUMMARY.

No harmful effects have been received by the patients—more than five hundred in number—that I have examined with the x-rays.

The varying resistance which the different tissues of the body offer to the passage of the Röntgen rays depends upon the difference in bulk and in chemical composition.

¶ The difference in permeability of air and water by the x-rays is of great importance in thoracic diseases.

The normal brightness of the chest having been observed in the fluoroscope, the departure from the normal in two directions may be noted by comparison. First, a given part of the chest may be darker than normal on account of the obstruction offered to the passage of the rays, which is due to the *increase* of density that occurs in tuberculosis, pneumonia, infarction, oedema, congestion of the lungs, aneurisms, new growths, or to fluid in the pleural and pericardial sacs, that occurs in pleurisy with effusion and pericarditis with effusion; the distribution, location, and amount of this increase in density which the fluoroscope shows, assists us in some cases to distinguish between these diseases or conditions. Second, a given part of the chest may be brighter than normal, because it is *more* permeable than in health by the rays on account of the *diminution* in density, due in the case of emphysema to increase in the amount of air in the lungs, or, in the case of pneumothorax, to increase in the amount of air entering the thorax and displacing the lung.

Importance of the diaphragm lines: The normal diaphragm lines on both sides of the chest (these include position, excursion, and curve of the diaphragm and the clearness with which they are seen) having been observed in the fluoroscope, departure from the normal may be noted by comparison. In tuberculosis and pneumonia the excursion of the diaphragm is restricted, and restricted on the lower side; in emphysema, on the contrary, although the excursion of the diaphragm is restricted, it is restricted on the upper side—the diaphragm may go lower down toward the abdomen—and in pneumothorax on the affected side it has a characteristic curve and moves only on its median end. In tuberculosis, pneumonia, pleurisy, hydrothorax, empyema, and œdema of the lungs, the diaphragm lines, as well as those of the heart, may be wholly or partially obliterated, owing to the abnormal density of the lungs in their lower portion. In some cases of tuberculosis and pneumonia the lessened range of movement of the diaphragm is a more delicate test than the diminished brightness of the lungs. The normal outlines of the diaphragm may also be changed by an abscess or a new growth contiguous to it.

The fluoroscope gives us better assurance that the lungs are in a healthy condition than other methods of physical examination, and, in connection with auscultation and percussion, teaches us in disease to interpret better the signs found by the older method.

The fluoroscope gives us earlier evidence of disease in some cases of tuberculosis and more accurate information of its extent (this affects the prognosis) than can be obtained by the usual physical examination.

The fluoroscope gives us more accurate information of the extent of the disease (this affects the prognosis) in pneumonia and of the duration of an abnormal condition of the lungs.

It shows a displacement of the heart in pleurisy, which is sometimes not recognized by other means, and assists us to recognize and estimate the amount of fluid in the pleural and pericardial sacs.

It enables us to recognize or exclude emphysema.

It enables us to ascertain the cause in some cases of dyspnea that would otherwise be obscure.

It assists us to recognize œdema of the lungs, pneumothorax, hydrothorax, and pneumohydrothorax.

It gives us the means of making an earlier and more certain diagnosis of some cases of thoracic aneurism than any other method, and enables us in certain cases to exclude it where it has been suspected but is not present.

It enables us to outline the heart more accurately and completely than has hitherto been possible and to observe certain changes in it; and it especially assists us to a more accurate determination of the

size, movement, and position in disease, and in some cases to observe not only the heart as a whole, but the auricle and ventricle separately. Further, it enables us to recognize earlier associated conditions, such as œdema of the lungs, and assists us to recognize pericardial effusion.

We may sometimes make a diagnosis by an x-ray examination alone, in certain cases of aneurism and emphysema, for example, but it is, as a rule, only one method of examination, and its value in assisting us to establish a diagnosis varies, of course, in different diseases. The x-ray examination should be used in connection with other methods; the information derived from it in suitable cases is more definite and accurate than that obtained from auscultation and percussion. The fluoroscope and the stethoscope aid each other.

As is the case with all other observations on which a diagnosis is founded, the conditions which are revealed by the fluoroscope are only to be rightly interpreted after experience in making x-ray examinations has enabled the physician to give these observations their proper weight.

I have had the privilege of studying the physics of the x-rays in the Rogers Laboratory of the Massachusetts Institute of Technology, and I am under obligation to Professor Charles R. Cross and two of his assistants, Mr. C. L. Norton and Mr. R. R. Lawrence, for their aid in this study. I also desire to express my appreciation of the active interest taken by the trustees of the Boston City Hospital in my work, and the kindness of my colleagues on the staff for affording me an opportunity of examining many of their patients.

THE DIAGNOSIS OF EARLY PREGNANCY.

By THOMAS WATTS EDEN, M.D. EDIN., M.R.C.P. LOND.,
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THE student of the diseases of women, and equally the general practitioner, must keep the fear of pregnancy ever before him. As a possible occurrence, it cannot be excluded from his mind, except in the case of old women and little girls, the earliest recorded pregnancy being at the age of eight, the latest at sixty-two years. Within these wide age-limits he must be prepared to meet and recognize it under the most unlikely circumstances; prepossessions must never sway his judgment or lead him to dismiss the eventuality from his mind as impossible, if the logic of physical signs points in its direction. In dealing with the diagnosis of pregnancy it is pre-eminently necessary for the medical man to be sure of himself. Circumstances may arise in which he cannot even mention the matter unless certain of his diagnosis, and nothing brings

him so surely to disgrace with his patients as an error here. And further, he must be as certain of its absence as of its presence; for the first step in the diagnosis of many pelvic or abdominal swellings is the exclusion of pregnancy. It is not too much, therefore, to say that an easy familiarity with the signs of pregnancy is an essential condition of success in dealing with the diseases of women. The opportunities of learning these signs are, fortunately, abundant, for I find that among the last 1000 cases that have passed through my hands in the Out-Patient Department of the Chelsea Hospital for Women there were fifty cases of early pregnancy.

Pregnancy may occur either within the uterus—*uterine pregnancy*, or outside it—*ectopic pregnancy*; in very rare cases the two may coexist, or ectopic pregnancy may be double.

UTERINE PREGNANCY. In the later months the diagnosis of pregnancy in the uterus is usually very simple, consisting of the direct discovery of a fetus—of the foetal parts by palpation, and the foetal heart by auscultation. The diagnosis of early pregnancy, on the other hand, is a deduction from the occurrence of a definite series of symptoms and physical signs. We are only concerned with the methods by which pregnancy may be detected during the first half of the period of gestation. There are two diagnostic points to be considered in every case: 1. The *existence* of pregnancy; 2. Its *duration*.

Symptoms of early pregnancy. It must be clearly understood that pregnancy cannot be diagnosed from symptoms alone; to attempt this is to invite disaster. Symptoms are useful, first, in offering presumptive evidence of pregnancy, and secondly, in assisting to estimate its duration. A single symptom standing alone is of little importance; thus amenorrhœa may be due to a variety of conditions quite unconnected with pregnancy, but when occurring in a woman previously regular, and associated with morning sickness and bladder irritability, or swelling of the breasts, it forms an important indication that the physical signs of pregnancy must be carefully sought for. Short periods of amenorrhœa occurring in women previously irregular are worthless for diagnosis. Further, in some women a slight periodic loss always occurs in the early months of pregnancy, so that the absence of amenorrhœa is not an absolute contraindication. The date of cessation of the menses is one of the most reliable guides to the duration of pregnancy, and should be noted carefully; the period of onset of the other symptoms is too variable to be of use in this respect. But it must be remembered that conception may ensue directly upon a period of amenorrhœa, as in lactation, and then the size of the uterus fails to correlate the duration of the amenorrhœa. On the other hand, if menstruation occurs during the first two or three months of pregnancy, the uterus may be found up to the umbilicus after two missed periods. The long lists of the consti-

tutional and symptomatic changes of pregnancy described in text-books of obstetrics need not be considered here, for their practical value is *nil*.

From these considerations it is sufficiently obvious that the symptoms of early pregnancy are too uncertain to offer any reliable basis of diagnosis.

Physical signs of early pregnancy. These are *external* and *internal*; the external are *mammary* and *abdominal*; the internal are *vaginal* and *uterine*.

Mammary signs. These are of prime importance in a first pregnancy; of minor importance in women who have had recent miscarriages or who have never suckled their children, or in whom several years have elapsed since the last pregnancy; and worthless in women more recently pregnant than this. In a nullipara it is often possible to detect a distinct hypertrophy of some of the lobules of the gland as early as the beginning of the second month; these portions are usually situated peripherally, and are firmer and more tender than the surrounding parts. Toward the end of the second month it is possible to express a little clear serum from the nipple by squeezing the gland between the thumb and finger. The nipple signs, such as pigmentation, erection, the formation of the secondary areola, and the enlargement of Montgomery's tubercles, appear a little later. They become permanent after suckling, and their presence is, therefore, of no diagnostic value in women who have already borne and suckled children. Purple striae and enlarged subcutaneous veins are not found in the early months of pregnancy.

Abdominal signs. The skin changes are inconclusive. The linea nigra is often found in virgins of dark complexion, and is often absent in pregnant *blondes*. Recent striae, which are pale-purplish in color, are seldom seen until a period when other signs suffice for the diagnosis; they can hardly be confused with old striae, which are white and shrivelled. The latter are often found in women in whom the abdomen has been distended by tumors or fluid accumulations in the peritoneum.

The gravid womb can usually be palpated from the abdomen at the end of the third month. In a multipara it can very frequently be felt through the lax abdominal walls at an even earlier period, by dipping the hand down into the pelvis. In a primipara much depends upon the degree of resistance of the abdominal wall. The feeling of a gravid womb is a sensation *sui generis*, and once learned is seldom mistaken; special pains should, therefore, be taken with this part of the examination.

The patient should be lying with the abdomen entirely exposed, the shoulders supported by a pillow and the knees bent; in this position the maximum relaxation of the abdominal wall is obtained. If the wall is lax one hand should be placed above the pubis, and the ulnar margin depressed toward the spinal column, so as to reach behind the uterus;

the fundus then fits into the hollow of the palm, and may be grasped between the fingers and thumb. If the wall is resistant both hands must be used, the points of the fingers being pressed down on each side of the uterus, which is thus grasped between them. In this way the presence of a mesial, or slightly lateral, rounded swelling can be definitely made out; its consistence is best described as soft and plastic; it is movable in a lateral plane and not tender. It differs from cysts or circumscribed fluid accumulations, in the absence of tension and of the fluid thrill. Further, if palpation be prolonged for some minutes, and especially if the swelling be gently rubbed with the hand, its consistence will be felt to undergo gradual rhythmical alterations, becoming alternately softer and harder. The change is not extreme, and care and practice are required for its detection; but with a little experience it can generally be obtained in a gravid womb large enough to be felt above the pelvic brim. It is not absolutely pathognomonic of pregnancy, for it is sometimes observed in cases of uterine fibromyomata, but it does serve absolutely to exclude swellings of extra-uterine origin. On auscultation, the uterine souffle will be heard at the sides of the uterus on pressing deeply with the stethoscope.

It will thus be seen that under favorable circumstances pregnancy may be diagnosticated by symptoms and external signs alone if it have advanced beyond the end of the third month. The most favorable circumstances are, that the patient be a nullipara, and the breast signs, therefore available; and that there be no undue difficulty in the abdominal examination. But the converse by no means holds good, viz., that the absence of these signs is sufficient to exclude pregnancy. The gravid uterus may be inaccessible from the abdomen at the end of the third month, because it is retroverted; or the ovum may have perished, in which case the size of the uterus does not correspond to the duration of the amenorrhœa, and the breast changes generally recede. It is a useful clinical rule that pregnancy can never be excluded except by the bimanual examination. Further, we are often called upon to diagnosticate pregnancy before the gravid womb is accessible to external examination, and then the bimanual is imperative; and in the great majority of cases of early pregnancy its employment is necessary because the external signs are inconclusive. In any case it is better to examine internally than to run the risk of error.

Vaginal signs. Blue discoloration (Jacquemier's test) I have never seen earlier than the third month. It consists of a deep, dull purpling of the vaginal mucosa, and is, of course, due to venous congestion from pressure upon the pampiniform plexus, and is not pathognomonic of pregnancy. It is more marked usually in multipare than in nullipare, and appears first upon the anterior or posterior walls immediately within the caruncle or hymen. Within the canal the walls feel lax and soft, and

pulsation may often be felt in the lateral vaginal arteries. The vaginal signs are not marked until a period at which the uterine signs are generally conclusive; their diagnostic value is, therefore, subsidiary, but in difficult cases they afford valuable confirmatory evidence.

Cervical signs. These are of more importance than the vaginal signs. Softening of the cervix may be distinct as early as the middle of the second month (sixth week). It first affects the lips of the os externum, and may then be confused by the tyro with the velvety feel of the condition known as "erosion;" but the speculum will always serve to distinguish this. Later the whole extent and thickness of the cervix becomes soft and succulent, forming one of the most striking of the physical changes in pregnancy; but this is seldom found before the mid-term, when its diagnostic value is subsidiary to the changes in the body of the uterus. The early stages of softening, however, form a very important diagnostic sign, and it is always worth while to pay careful attention to the condition of the cervix. The absence of softening, especially in a multipara, has not the same negative value, however, for an unhealthy, indurated cervix softens much more tardily than a healthy one. Purpling of the vaginal portion of the cervix is met with rather earlier than the same change in the vagina; it is due to the same cause, and is not absolutely characteristic of pregnancy. But cervical softening, when distinct, is almost as pathognomonic as the foetal heart, although it is found equally in uterine and extra-uterine pregnancy.

Uterine signs. The changes in the uterus in early pregnancy are, briefly, *enlargement* with *distention*; the former is due to general hypertrophy of the organ; the latter to the presence within it of a bag of fluid containing a mobile, solid body—the foetus. The shape of the uterus is determined partly by the hypertrophy and partly by the distention; the general pear-shaped contour is preserved; but while the empty uterus is flattened, the gravid uterus is bulging, the fundus feeling almost spherical. The consistence of the uterus is determined partly by the muscular character of its walls, and partly by the bag of fluid within. The muscle is hypertrophied and undergoes rhythmical contractions, hence the rhythmical changes in consistence which occur. The fluid within lends it softness and plasticity, while the free solid body may be made to impinge upon different spots of the wall, delivering blows which can be felt by the fingers (*ballotement*).

Under favorable circumstances the uterine changes can be made out as early as the end of the second month (seventh to eighth week). At this period the ovum measures two inches by one and one-half inches, and in the great majority of cases is situated at the fundus. The uterus is considerably lengthened, and an empty space remains between the lower pole of the ovum and the os internum. The fundal portion, however, is completely filled by the ovum, and is converted from a

potential cavity into a globular space with a diameter of about one and one-half inches. The normal anteversion of the uterus is usually somewhat exaggerated, and, given a lax abdominal wall, there is little difficulty in palpating the uterus with exactness. A certain acquaintance with the size and consistence of the non-gravid womb is, of course, essential, but the rounded, bulging outlines of the early gravid womb are so striking that a *tactus eruditus* is hardly necessary for their detection. The distended uterine fundus can be taken between the hands and its peculiar soft and yielding existence made out; but at this stage rhythmic contractions cannot be felt, the foetus is too small and light to give *ballotement*, and the amount of liquor amnii too small to yield fluctuations through the many intervening layers of tissue. An attempt should next be made to palpate the empty lower pole of the uterus between the two hands. The internal fingers are placed immediately in front of the cervix, and the external fingers passed down the posterior surface of the uterus, and then directed to meet them, so as to grasp the lower part of the body of the uterus between the two hands. The fingers can be made to meet at this point through the soft walls with surprising ease, but it is necessary to remember that even in the non-gravid womb the tissues are thinnest here. But in pregnancy the contrast between the bulging upper pole and the flaccid, empty lower pole is so distinct as to constitute a valuable sign of pregnancy, which is known by the name of its introducer as Hegar's sign. To obtain this sign it is essential, first, that the abdominal walls be lax, and the vagina fairly roomy; and second, that pregnancy be not advanced beyond the end of the third month, when the uterus becomes too large to be thus handled, and the ovum has practically filled up the whole of the uterine cavity.

A month later (twelfth to thirteenth week), the uterus has increased very considerably in size, and can often be palpated from the abdomen. Bimanually it feels globular and as large as a Jaffa orange. A new sign is now apparent, namely, muscular contractions in the wall of the uterus. These are of two kinds, the rhythmic and the irregular. Rhythmic contractions show themselves in a gradual variation in consistence of the whole of the uterus, which becomes alternately harder and softer under the hands, if the examination be made in a leisurely manner. Often the contractions are so feeble that they only serve to render the outline of the uterus more distinct. They are, of course, produced by waves of contraction affecting the uterine muscle. A little care and experience are required for the appreciation of this sign, as the change in consistence is never very marked at this early period. The irregular contractions are much more easily detected, and form one of the most useful diagnostic points of a gravid uterus between the third and fourth months. They consist in tetanic contractions affecting localized areas of the uterine muscle, while the greater part

of the wall is unaltered. Their effect is to make the uterus feel irregular, both in shape and in consistence. Thus the greater part of the uterus may feel soft and cystic, while one or other cornu is occupied by a hard lump which may be regarded as a fibroid on first examination; or one lateral half may be hard and firmly contracted, and the other half soft and bulging; or there may be a mesial band of contraction hollowing out the fundus and anterior wall, while the sides are soft and unaltered. These contractions are not intermittent, but on a second examination, a few days later, the uterus may be found to be in every respect symmetrical, or to have assumed some new deformity. Before I learned the significance of these changes in the pregnant uterus I had rashly diagnosticated fibroids in various parts, and even tubo-uterine pregnancy, only to find myself on subsequent examination confronted with a typical normal pregnant uterus. This sign, which was first pointed out by Ahlfeld, is well known and appreciated in Germany, but receives little attention from British teachers.

The only other sign of importance in the early gravid uterus is *ballotement*. This is not of great practical use, from the fact that one so frequently fails to obtain it in an undoubted case of pregnancy. To obtain ballotement easily, examination must be made with the patient in the erect position, a proceeding quite at variance with our accepted notions of propriety. With the patient lying on her back, the fœtus tends to fall toward the posterior uterine wall, which is difficult of access, hence the frequency with which the sign is absent in ordinary examination. At times, however, one succeeds in obtaining it, and I have found the following the most useful method: With the abdominal hand the uterus is pressed firmly down into the pelvis; then the vaginal fingers administer a quick, gentle jerk to the anterior uterine wall, which tosses the fœtus upward through the liquor amnii, supposing it to have been resting at that part of the uterus; this may be answered in a moment by a gentle tap representing the fall of the fœtus, but more often it is not. Sometimes with the fingers behind the cervix, or in the rectum, the tap may be felt, when one fails to get it through the anterior fornix. But it is not worth while to spend much time in the effort, although the positive value of the signs is, of course, considerable. I have, however, felt ballotement through the anterior fornix in a case of tubercular peritonitis, where it was shown by subsequent operation that the tap came from the ovary, which could be tossed up through the encysted fluid by pressure from below.

It may be useful to tabulate the physical signs of early pregnancy in the order of their occurrence.

End of second month (eight weeks):

Breast signs (important only in first pregnancy).

Softening of cervix.

Distention of fundus.

Hegar's sign.

End of third month (twelve weeks):

Breast signs (important only in first pregnancy).

Bluing of vaginal walls and cervix.

Softening of vaginal walls and cervix.

Uterus size of large orange.

Hegar's sign.

Uterine contractions.

End of fourth month (sixteen weeks):

Breast signs (important only in first pregnancy).

A supra-pubic swelling.

Uterus size of fetal head.

Uterine contractions.

Ballottement.

Vaginal and cervical bluing and softening.

ECTOPIC PREGNANCY. Ectopic pregnancy has become such a fruitful field for the abdominal surgeon, that we are, perhaps, apt to lose sight of the fact that it is, after all, but a physiological accident, liable to befall any healthy woman during the fruitful period of life. For reasons which are at present obscure, the fertilized ovum becomes in some cases implanted upon some part of the Fallopian tube instead of upon the uterus, but there is no evidence to prove that diseased conditions of either uterus or tubes play any part in its occurrence. Nevertheless it is one of the most perilous accidents to which child-bearing women are subject, and as experience has shown its early recognition to be quite practicable, it devolves upon every practitioner to place himself *au courant* with the principles and methods of its diagnosis. Its consideration along with uterine pregnancy is justified by their physiological relations, and by the fact, surprising as it may seem, that the differential diagnosis of the two is often a matter of very considerable difficulty.

It is not possible by clinical methods to determine the exact site of an ectopic ovum; all the anatomical varieties of tubal pregnancy may, therefore, be classed together here, and with them must be associated the rare condition in which pregnancy occurs in a rudimentary horn of a bicornate uterus. The occurrence of ovarian or primary abdominal pregnancy is open to the gravest doubt.

Symptoms of ectopic pregnancy. These are somewhat less equivocal than the symptoms of early uterine pregnancy. In a large proportion of cases the patient has been sterile for many years, although this is by no means always the case. The menstrual function is for a time in abeyance, and then is succeeded by irregular or persistent hemorrhage. It is rare for more than two periods to be missed; after this comes hemorrhage, variable in amount, generally accompanied by considerable

pain, and sometimes by the discharge of a fleshy mass from the uterus—the decidual cast. In addition we find the patient usually complains of morning sickness, and perhaps of swelling and tenderness of the breasts. The symptomatology thus far is closely suggestive of an early abortion, and in point of fact many cases which come under notice at this period are thus mistaken, especially when the mass discharged from the uterus has not been seen by the medical man. As a rule, however, the abdominal pain precedes the hemorrhage by a week or two, or even longer, and persists or grows more intense after the occurrence of the supposed abortion. This should put us at once on our guard. Further, between the second and third months an occurrence is very frequent, which gives rise to definite and obtrusive symptoms, viz., rupture, partial or complete, of the gestation sac. This accident may be spontaneous, but more often it ensues upon slight exertion, such as stooping, or straining at stool. It is characterized by sudden pain and shock; the pain is abdominal, but not specially localized; the degree of shock is very variable, it may be merely a slight feeling of faintness, with nausea or vomiting; on the other hand, it may be prolonged and protracted, as in cases attended with profuse internal hemorrhage. Cases of the latter class pass at once into the hands of the medical man, and have to be carefully differentiated from such conditions as perforation of a gastric ulcer, perforating appendicitis, acute intestinal obstruction, etc. Cases of the former class very frequently do not seek immediate advice, and the history of the occurrence has to be extracted from them after the lapse of some weeks or even months. When obtained, however, such a history is a very important diagnostic point in these cases. The latter history of cases of partial rupture is usually one of progressive and increasing illness; sometimes the sac suppurates; in rare cases absorption occurs, and the patient gradually recovers; more rarely still gestation goes on to term, when the fetus perishes unless rescued by surgical interference.

Physical signs of ectopic pregnancy. As in uterine pregnancy, the ultimate diagnosis must rest upon physical signs—*i. e.*, upon the discovery, by the bimanual examination, of an ectopic gestation sac, or, more accurately, of a swelling outside the uterus, which may be presumed to be a gestation sac. The changes in the breast, vagina, and cervix uteri occur in this condition very much as described in uterine pregnancy; the changes in the body of the uterus are, however, different, because it does not contain the ovum. In addition there is the presence of an extra-uterine swelling.

We have only to consider the physical signs of early ectopic pregnancy; they differ considerably before and after rupture.

Physical signs before rupture. In the great majority of cases rupture occurs during the third month (eighth to twelfth week); it is, therefore,

very exceptional to find an unruptured tubal pregnancy which has advanced beyond the third month. The bimanual examination is usually fairly easy, and reveals changes in the pelvic organs so marked that they cannot be missed. On one or other side of the uterus is found an oval or globular, tender swelling, of soft and plastic consistence, and crossed below by one or more pulsating vessels. It is usually slightly movable in a vertical plane, but immobile laterally. Its size is subject to great variation, being dependent upon two conditions, viz., the stage of development of the ovum and the amount of effused blood in the tube. The latter is the more important factor, for the ovum almost always perishes about this period, and rupture is due, not to the growth of the ovum, but to the distention of the tube by hemorrhage. There is, therefore, not the same regular increase in size of a tubal gestation sac as we find in a gravid uterus. The tube, however, seldom becomes larger than a tangerine orange without bursting under the strain. The muscular element in the walls of the sac is too feeble to give rise to the contractions which form an important sign of a gravid uterus. When the ovum occupies the outer end or ampulla of the tube, the inner empty part of the tube may sometimes be palpated between the sac and the uterine border, and may be traced from one to the other, proving the swelling to be tubal in origin. The ovary cannot, as a rule, be distinguished from the gestation sac.

The uterus is displaced by the swelling to the opposite side of the pelvis; it is enlarged and softened, but the fundus is flaccid and empty, and feels quite different from an early gravid womb. Its mobility is unimpaired except for the presence of the lateral swelling. The opposite appendages may often be clearly felt to be unaltered; they may, however, feel swollen and tender. There is rarely difficulty before rupture in distinguishing the uterus from the gestation sac, but I have once or twice been deceived by the irregular contractions in the gravid uterus, described on a previous page. The sound is usually to be avoided as a method of differentiating uterine from ectopic gestation.

The differential diagnosis before rupture is generally limited to one condition, viz., suppurative inflammation of the appendages. The physical signs do not absolutely suffice to distinguish them, nor do the symptoms. In pyosalpinx there is usually a prolonged history of abdominal pain and general illness, but the condition may supervene rapidly upon a miscarriage, and then the history closely simulates that of ectopic pregnancy, in which a decidual cast has been expelled from the uterus. The temperature is useless as a guide, for in ectopic pregnancy there may be considerable pyrexia of irregular type, running up to 103° , while a pyosalpinx is not always attended by fever. The menstrual history is the safest symptom to rely upon, for definite periods of six to eight weeks' amenorrhoea very rarely occur in suppurative inflammation

of the appendages. With regard to physical signs, a pyosalpinx is usually accompanied by a much greater degree of surrounding inflammatory changes than a gestation sac; it therefore tends to form a fixed swelling, harder in consistence, and much less definite in outline. The uterus, although enlarged, is usually hard and its mobility greatly impaired, and the opposite appendages may be also obviously diseased. The discharge of a decidual cast, when carefully determined by the microscopic examination of the discharged tissue, is very important evidence of ectopic pregnancy, although even this sign is not pathognomonic, as was once supposed.

Physical signs after rupture. Rupture may occur in the following different ways:

1. Intra-peritoneal rupture.
 - (a) Leading to sudden and profuse hemorrhage, endangering life.
 - (b) Leading to slow, progressive hemorrhage and the formation of a pelvic hæmatocele.
2. Broad ligament rupture.
 - (a) In rare cases leading to profuse hemorrhage, endangering life.
 - (b) More often progressive, forming a pelvic hæmatoma.

The cases in each division attended by profuse bleeding give rise to the constitutional signs of concealed hemorrhage, and are submitted to immediate operation. I have seen only one case of this kind in which the rupture was extra-peritoneal, but here an enormous swelling developed within a few days, extending above the umbilicus, and filling the whole pelvic cavity. Operation proved the blood to be entirely contained between the layers of the broad ligament. Profuse bleeding from intra-peritoneal rupture is much more common.

The differential diagnosis of cases (b) in each division is a matter of some importance, but is often attended with great difficulty, which may become insuperable when a broad ligament sac ruptures later on into the peritoneal cavity. This event is known as secondary intra-peritoneal rupture. When the amount of effused blood is considerable the gestation sac becomes obscured, and the physical signs tend to resolve themselves into those of pelvic hæmatocele and pelvic hæmatoma respectively. Blood effused slowly into the peritoneal cavity tends, of course, to accumulate in the pouch of Douglas, forming a retro-uterine swelling; while blood effused into the broad ligament distends that structure, forming a swelling lateral to the uterus. But lateral displacement of the uterus may have occurred before intra-peritoneal rupture took place, and then the condition will closely simulate a hæmatoma. Further, blood in the broad ligament tends to raise the peritoneum over the whole pelvic floor, and thus creeps along behind the uterus, surrounding the rectum, and even extending over to the opposite side. In this way a hæmatoma may simulate a hæmatocele.

The changes which occur in the effused blood form an important guide. Intra-peritoneal blood undergoes clotting in parts, while other parts remain fluid; the mass thus varies in consistence in different parts, the fluid parts feeling soft and boggy, and the clotted parts harder and more solid. A hæmatoma is more regular in consistence from the absence of this irregular clotting; it feels also much firmer and more solid than the hæmatocele, owing to the pressure to which it is subjected by the limiting layers of tissue. Rectal examination often aids in determining the consistence of these swellings, and may also show a ring of effusion around the rectum high up, a condition strongly favoring the diagnosis of an hæmatoma.

The importance of distinguishing between the intra-peritoneal and the extra-peritoneal forms of rupture lies in the fact that in the latter it is often possible to leave the case to nature, and trust to the occurrence of absorption of the swelling; in the case of intra-peritoneal rupture, however, it is always better to operate without delay, owing to the grave risks of recurrence of the hemorrhage, which may at any time become profuse and place the patient's life in peril. But often the matter remains in doubt, and the question of interference must be decided upon other grounds.

In most cases of ruptured ectopic pregnancy, and in some cases before rupture, when the gestation sac is of large size, it is a matter of great difficulty to determine the position of the uterus and its relation to the swelling in the pelvis. In the absence of definite proof of the position of the uterus, the differential diagnosis from a retroverted and an incarcerated gravid uterus often becomes a matter of the greatest difficulty. Yet the practical importance of a correct diagnosis is very great, for the treatment of the latter condition is not abdominal section, but evacuation of the uterus. Examination under an anæsthetic is often a great help in clearing up the matter, by enabling the examiner to determine the size and position of the uterus by the bimanual method. In the present instance there need be less hesitation in using the sound, because if the case be ectopic no harm can result, while if it be uterine, the proper treatment is the induction of abortion, and the passage of the sound is, therefore, not only a diagnostic but an appropriate operative procedure.

REVIEWS.

A HANDBOOK OF MEDICAL CLIMATOLOGY. By S. EDWIN SOLLY, M.D., M.R.C.S., late President of the American Climatological Association. 8vo. pp. 470. Philadelphia and New York: Lea Brothers & Co., 1897.

THE American medical profession has been slow to recognize the natural advantages which the United States offers for the therapeutic use of its climate. Although Americans are justly said by Europeans to be constant travellers, they often know less of their own country than of Europe. Of late years, however, as internal medicine has become more exact and modern therapeutics has come to embrace every agency for the cure of disease, the climate of the United States has been utilized not only by American travellers, but also by American invalids. There has been wanting a book which prescribes properly the climate of this country with reference to its fitness for the treatment of disease. Weber has given us his excellent handbook of European resorts, but it remained for Solly to be the first American author to supply the needed volume.

The book naturally begins with a brief statement defining medical climatology, and showing the difficulties which such an author has experienced from lack of accurate meteorological data. While the United States Weather Bureau does its utmost, its support is so scanty that it fails in many respects. This is especially true in the lack of humidity observations, and, as the degree of dampness is a vital factor in a given climate, this lack is very serious.

The principles of medical climatology are clearly set forth, and earth, air, water, light, and electricity each receives consideration as factors in a climate. Next follows the physiology of climate, and then its ethnology. The geographical distribution of disease, embracing the civilized world, naturally prepares the way for a classification of climate. A table is given of the principal stations from various portions of the United States, showing summer and winter temperatures and their differences. This concludes the author's very clear and interesting account of the principles of medical climatology.

Section II. is devoted to the influence of climate upon disease, and here, naturally, phthisis first receives extensive consideration. A distinction is made between phthisis and tuberculosis, and the effect of the various elements of climate upon the disease is carefully considered. It is shown that phthisis is most common where the air is impure, experiments having demonstrated that animals inoculated with tubercle bacilli successfully resist if kept in pure air, while others similarly poisoned and kept in close quarters die. Attention is called to the importance of direct sunlight in destroying bacilli. Humidity is shown to be a most powerful factor for evil with the phthisical.

Dryness of air is quite as potent for good as humidity is for evil.

Contrary to a common belief, severe and sudden changes of temperature, provided the air be dry, not only are not injurious, but are beneficial to the phthysical. It is interesting to observe that neglect of sanitary precautions and unhealthy occupations can neutralize the advantages of a favorable climate. Changes of temperature, with moisture, and dampness of soil are proverbially injurious. As Weber remarked, cold is not injurious, nor warmth curative, in phthisis. Equable climates are not necessarily best; but pure air is absolutely essential. It is interesting to note the good effects of a pure atmosphere considerably below the sea-level, which is virtually the use of compressed air on a large scale.

The author next considers the effect of altitude, and shows by tables the diminution in death-rate in higher parts of the world. It is hard to estimate the least altitude which is of benefit to the phthysical, but probably a change of 1500 feet may prove of value. The effect of altitude upon the phthysical is explained by physiological changes. The reduction of oxygen pressure causes the patient to breathe more rapidly, expanding the chest, increasing the action and size of the heart, and also the amount of red blood-corpuscles and hemoglobin, enhancing the oxygen-absorbing power of the blood in definite ratio to the elevation. From these considerations the general conclusions are drawn that high altitudes have climates favorable for anæmic patients, or those suffering from any other deficiency of the blood; while in chronic germ diseases the improved state of the blood in these cases is of great value, providing the accompanying conditions are not of a nature to be seriously aggravated by altitude. While experiments have not positively demonstrated an increase in the germicidal power of the blood in those inhabiting high regions, clinical observation leads us to believe in its existence. The increased sunlight and sunheat, with electric tension and increased ozone, act practically as efficient germicides to prevent the spread of tuberculous infection.

The author divides phthisis as influenced by climate into tuberculous, pneumonic, and catarrhal. Tuberculous patients do best in most cases in cool, dry climate, and less often in warm, dry climate. Patients of the pneumonic type are in danger in cool, dry air of over-stimulation of the lungs, and hence a warm moist climate as a sedative is better. Catarrhal cases thrive in warm, dry air, which lessens the secretion and acts as a stimulant.

The author devotes attention to the individual and his peculiarities. He divides patients into the wise and unwise, and urges that it is not the consultant, but he who sees the patient repeatedly, who can judge him best. He urges a careful study of the patient's temperament, and presents a table which shows the relative value of temperament as influencing recovery. Naturally enough, a strong physique, irrespective of temperament, is most valuable. The phlegmatic do better than the nervous, provided that each is strong. If physique be poor the nervous patient does better. The writer found that 61 per cent. of patients were wise in caring for themselves, and 39 per cent. were foolish. We are interested to learn further that persons of phlegmatic temperament and strong physique are most apt to show wisdom. The doctrine of rewards and punishments is exemplified in statistics which show that one-third more of the wise are cured above the average of mankind, and four times as many as among the foolish. This Book of Climatological Proverbs closes with the sage conclusion that the essentials of the

general treatment of phthisis are to preserve and strengthen the physique, enforce prudence, and induce placidity. We are glad to know that at least among the phthisical the modern philosophical tenet is not true—"Be good, and you'll be lonesome."

The writer goes into a careful consideration of the results of the treatment of phthisis by change of climate. Here, again, high altitudes bear the palm. The results of various writers the world over are carefully tabulated to show this fact. In comparison with sea climates, it is shown that the phthisical do better the further they are removed from the sea and in high altitude. As regards the use of tuberculin, Trudeau has found it of service only where the patient could tolerate without fever a gradual increase in dosage. Solly's belief is that the moderate use of tuberculin does not materially influence phthisis. There can be, however, no reasonable doubt of the value of sanitarium treatment. It is greatly to be regretted that the well-to-do resort to it so unwillingly, and that there are so few free beds in sanitariums for the poor.

The author urges the danger which attends improvement in the first stages of phthisis. The patient is often deceived into returning to his former home, only to relapse fatally. It is interesting to note that in 52 per cent. of cases diagnosis and treatment were too late for marked improvement, the average delay being two years. The serious consequence of this negligence is shown in the fact that 62 per cent. of first-stage cases were benefited, and but 15 per cent. later. The author concludes this portion of the book by a timely plea for care in the selection of the cases to be sent away from home, and surely the practical experience of the profession, and the many sad disappointments which occur in badly chosen cases, must emphasize the truth of his statement.

We have dwelt thus upon the first portion of the book because of its wide general interest. Other forms of disease are next considered, and the influence of climate upon them. Due caution is urged that patients recovering from pneumonia are not sent suddenly to an altitude and allowed to exercise upon arrival. In asthma barometric pressure is the important element, and must be decidedly increased or decreased to produce a result. In hay-fever the patient must avoid the pollen or dust which excites it. In diseases of the heart high altitude excites and disturbs an irritable heart, even when not diseased. In diseases of the kidney altitude tends to aggravate acute nephritis, and to hold in check chronic nephritis. Solly prefers a warm, low inland climate for chronic renal disease, and especially such surroundings as tend to promote a healthful action of the liver. Altitude does not prevent rheumatism, but aggravates it. Cold and damp are especially injurious.

The limitations of space forbid us from commenting in detail upon the remainder of this book. One hundred and eighty-eight pages are devoted to North and South America, and a reader who is not familiar with the United States will be surprised at the wealth of its climatological resources. Excellent maps, some of them in relief, and abundant tables fully illustrate this portion of the book. The climates of the various resorts of Europe also receive consideration, while the resorts of Africa, Asia, and Australasia are described. The island climates most resorted to are described in concluding the volume. Meteorological tables are appended.

In concluding our review of this volume, we congratulate the profes-

sion of America upon the acquisition of an interesting, reliable, and valuable treatise on climatology. It should enable the profession to act intelligently in the important choice of residence for invalids, and greatly increase the number of cures in patients whose diseases can be favorably affected by climate.

E. P. D.

REFERENCE BOOK OF PRACTICAL THERAPEUTICS. By Various Authors.

Edited by FRANK P. FOSTER, M.D., Editor of the *New York Medical Journal* and of Foster's *Encyclopaedic Medical Dictionary*. Vol. II. [N to Zymoidin]. Pp. 618. New York: D. Appleton & Company, 1897.

THE second and concluding volume of this work has appeared with commendable promptness, and, like the first, shows the painstaking labor of the editor. The sections devoted to serum-treatment (p. 166), thyroid treatment (p. 287), and mineral waters (p. 362) are exceptionally good. Usually the information is complete and so far advanced as is possible when delays incident to presswork are taken into consideration. As an exception to this statement may be cited that concerning nuclein (p. 19) and strophanthus (p. 230). In the matter upon rhus (p. 131) we find no mention of Pfaff, whose work is quite as important as any which has been done. Of minor errors we find fewer than would have been anticipated in a work of this character. The following is curious (p. 11): "Nitroglycerin is sometimes erroneously regarded as a nitrite. It is a trinitrite of glyceryl." Its correct chemical name, however, is found under nitroglycerin (p. 14). The binder is probably responsible for the cover-title reading "N-X-rays." As a matter of fact, X-rays are noticed on p. 397 and also at the end of the appendix, which is composed of omitted and additional matter. The references are usually to journals, giving year, month, and sometimes date. If their insertion is intended to facilitate reference to original articles, the year, number, and page, as given in the *Index Medicus*, would have been much more satisfactory. The general index, double columns, extending from pages 459 to 544, adds greatly to the value of the work. That of diseases and remedies, from pages 545 to 613, is valuable to the thorough student, but encourages the lazy practitioner, who regards the name of a disease as a peg upon which to hang a prescription. The index of authors (pp. 614 to 618) is hardly satisfactory. For example: On reading the section devoted to toxins there is no indication as to the author quoted until we find a reference "to my most recent paper in THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES for September and October, 1896." We recall at once that the author is Coley, but the "List of Authors" does not contain his name. We turn to our files and find that the article in question is contained in the September and not the October number of this JOURNAL. We continue our reading, and the brackets are unnecessary, for we recognize the editor's concise words, finding clearly stated the important views which have been presented. At the end, closely following the editor's work, we note the name of the contributor, which is Coley. A contributor using his own material to fill up his copy should know where

it appeared ; nor should he expect an editor to furnish not only a larger amount of material, but also the results of more extensive research in current literature. We call attention to this not because we do not appreciate the excellent work of the contributor, but in connection with the wish, which we expressed in the review of the first volume, that the editor had contributed more extensively to it. The favorable opinion of the first volume which we expressed applies equally to this, which has maintained the high standard with which this work was begun.

R. W. W.

DISEASES OF THE GALL-BLADDER AND BILE-DUCTS. By A. W. MAYO ROBSON, F.R.C.S., Hunterian Professor of Surgery and Pathology, Royal College of Surgeons of England. Pp. 150. New York : William Wood & Co., 1897.

THIS monograph is a reproduction of the Hunterian Lectures before the Royal College of Surgeons in 1897, and embodies the result of Mr. Robson's experience in hepatic surgery during many years of practice. An appendix is added giving in a tabulated form the details of 170 consecutive operations on the gall-bladder and bile-ducts.

The discussion of the topic selected by the author is conducted in a clinical rather than a pathological manner. It is exceedingly valuable as a contribution to clinical surgery. Its worth would be greater if more attention had been given to the pathology of the conditions described. A great many specimens from the English museums have been examined by Mr. Robson, and of a good many of them photographic illustrations are given. The work of American surgeons in this branch of operative work has been well recognized, and many cases are cited from American literature. The many practical points contained in the book will render it a valuable one to those working in abdominal surgery.

The author is disposed to treat diseases of the gall-bladder and bile-ducts in a radical manner. Among his other propositions are two which are worth mentioning in this short review : The first is that obstinate catarrh of the gall-bladder should be treated as the similar condition of the urinary bladder,—by medical and general remedies for a moderate length of time, and, in the event of these failing to produce cure, the establishment of physiological rest of the organ by drainage. This is to be accomplished by the performance of cholecystotomy. The second proposition concerns phlegmonous cholecystitis. He here advises incision and drainage, which necessitates, therefore, an exploratory incision as soon as the diagnosis is made. If, however, gangrene is found to be present, the gall-bladder is to be removed, just as in gangrenous appendicitis the appendix is excised.

Such surgical activity is in accord with the results of modern thought ; and though some may think these conclusions a little radical, they are probably those which are entertained by surgeons who have had the most experience in abdominal surgery. The volume should be in the hands of physicians as well as surgeons ; since many of both classes do not realize the necessity for prompt surgical interference in these pathological conditions of the bile-tracts.

J. B. R.

TRAITEMENT DE LA BLENNORRHAGIE. Par E. DELEFOSSE, M.D. Pp. 261. Paris: Caccoz, 1897.

TREATMENT OF GONORRHOEA. By E. DELEFOSSE, M.D.

THIS very convenient little book presents the treatment of this disease as it occurs in both man and woman. It is thoroughly illustrated—almost unnecessarily so when an illustration of a storage-battery as a source of light for endoscopy is introduced. It is well advanced as to our present therapeutic knowledge, save that the statements on the newer silver salts are made by quotation and not from personal experience. In this connection Knowles Swinburne will doubtless be surprised at appearing as Knowleo (p. 114). The author appears to have considerable faith in the abortive treatment for men. Of especial importance is his insistence upon the use of the endoscope and the unfortunate effects of this disease as it occurs in women. Although but forty pages are devoted to the latter subject, there is no doubt as to the importance which the author considers it to have. As an appendix we find an excellent formulary of the newer additions to our therapeutic resources. We are of the opinion that this is a concise, practical, and safe presentment of the present status of the treatment of gonorrhoea.

R. W. W.

PRAXIS DER HARNANALYSE. ANLEITUNG ZUR CHEMISCHEN UNTERSUCHUNG DES HARNS, NEBST EINEM ANHANG: ANALYSE DES MAGENINHALTES. By DR. LASSAR-COHN, Universitätsprofessor zu Königsberg i. Pr. Pp. 38. Hamburg und Leipzig: Verlag von Leopold Voss, 1897.

ANALYSIS OF URINE AND STOMACH CONTENTS. By LASSAR-COHN.

THE little work before us is certainly most commendable. The writer draws attention to the prevailing opinion among physicians that even the simplest tests in the chemical examination of the urine and the gastric juice require an intimate knowledge of chemical manipulations, such as can only be obtained after a prolonged period of study. He shows that this view is untenable, and very justly maintains that with but little attention the physician will be enabled to test intelligently for the presence of all of the more important chemical constituents of the urine and the gastric juice, and that his results will be entirely reliable if he strictly adheres to standard methods, such as those described in this little work. The tests for albumin, sugar, acetone, diacetic acid, bile-pigments, urobilin, blood, indican, and the conjugate sulphates, as well as the methods for the quantitative estimation of albumin, sugar, and the conjugate sulphates, are considered in detail. In the second portion of the work the tests for hydrochloric acid, lactic acid, and the volatile fatty acids are further described. Most valuable are the instructions given for the artificial preparation of abnormal urines, a feature which is new in text-books on Urinary Analysis, and which in itself renders the booklet valuable to both teacher and student. We are also glad to see that the old test of Uffelmann for lactic acid has been discarded. In Germany the work should be especially valuable to chemists and druggists, to whom physicians resort for such examinations. Clinical data are practically omitted. The statement on page 19, that conjugate sulphates can scarcely occur in the urine after a thorough cleansing of the intestinal tract, requires some modification.

C. E. S.

PROGRESS OF MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Treatment of Insomnia.—The most important discussion, from the therapeutic stand-point, at the Montreal meeting of the British Medical Association was upon this subject.

DR. C. K. CLARKE adopts Sée's classification of insomnia: as (1) dolorous; (2) digestive; (3) cardiac and dyspnoeal; (4) cerebro-spinal and neurotic; (5) psychic; (6) of physical fatigue; (7) genito-urinary; (8) febrile and autotoxic; and, finally (9), toxic. Of these the cerebro-spinal and neurotic insomnias were chiefly presented. Here there is little hope from the protracted administration of hypnotics, sedatives, and narcotics; but, on the contrary, we might look for results the opposite of satisfactory. Under some conditions it may be necessary to adopt the routine administration of hypnotics, not only with the hope of cure, but also as a means of keeping a restless patient quiet. Yet without drugs and by simple physical means it is easy in many cases to restore normal arterial tension and cause sleep. In the insomnia of acute mania the warm bath is often of the greatest value. Usually water is used at a temperature not exceeding 104° F., and this is continued for twenty minutes or more while cold applications are made to the head. This temperature is safer than that of 110° F., as advised by some authors, and there is less danger of producing collapse, a danger never absent in a case of mania. Of course, the warm bath is contra-indicated when heart-failure is threatened or when organic heart trouble is present. Sometimes the time-honored cup of hot milk at bedtime induces the sleep habit, and when a stimulant is indicated a hot toddy is oftentimes worth a dozen doses of chloral or its equivalent. Insomnia occurring in neurasthenia is possibly one of the most difficult and unsatisfactory forms to deal with, but a study of the arterial pressure at the radial pulse will invariably show that in this condition the pressure is lowered. If the feeble heart is strengthened with digitalis, sleep is possible. In many cases one can substitute the

dynamic agents, massage, frictions, douches, and transfusions, and at the same time caffeine and digitalis can be employed. For those who are driven to do their thinking in bed, a glass of hot milk on retiring or a half-pint of bitter ale answers every purpose. Change of air is extremely valuable, and for most persons of a nervous type an outing under canvas in the northern woods of Canada is a sleep producer of the most remarkable kind. Certainly simple methods should be tried before drug treatment is decided upon.

DR. REYNOLD WEBB WILCOX prefaced his remarks by the statement that the treatment of insomnia is the treatment of a symptom. The disease of which insomnia is a symptom should be sought out and treated; in this way many and diversely-acting drugs were indirect hypnotics. He denied that organic brain disease was caused by insomnia, but rather that this symptom demanded an effort to seek out obscure brain affections. When all had been accomplished by hygienic and physical measures which was possible, there yet remained an important place which drugs and drugs alone could occupy. Routine prescribing is utterly indefensible; equally so is the reckless administration of drugs. Insensibility is not sleep. The smallest amount, and that of the most harmless drug should be selected. We desire sleep-persuading not sleep-compelling drugs. In ascertaining the mode of action he reviewed the physiology of sleep, noting the various chemical and physical theories which have been advanced. The theory of Howell explains chiefly the good effect of hot baths, but aids little the theory of drug action.

The theory of the neuron of Rabl-Rückhard, taken in connection with the observations of Hodge and the work of Ramon y Cajal, gives the best working hypothesis for pharmacological investigation. Quoting Dercum, that sleep is explained as follows: "The cortical cells in the motor area have processes extending toward the surface—dendrites—and a protoplasmic process extending downward through the white matter of the brain, internal capsule, the crus, the pons, the medulla, and into the spinal cord, where it terminates in a brush-like extremity—the end tuft. Here it has a certain relation to the motor cells in the anterior horn of the cord—probably one of contact, though this is not definitely known. If the nerve-cells retract this contact is broken; if the abnormal contraction of the nerve-process is relieved for the time being, contact once more takes place." Evidently, if the neurons are functionally active, their dendritic processes must be in contact; without this consciousness is impossible. When the nerve-cells are exhausted by fatigue, there is every reason to believe that their volume shrinks, and it is, therefore, more and more difficult for them to remain in contact. When relaxation comes, the processes retract and unconsciousness—that is, sleep—supervenes. The action of drugs is probably to induce this severance of contact, and the studies made upon alcoholic radicles and chlorine compounds are cited, the depressing effects of these and their neutralization by amide radicles being set forth. Of individual drugs, he believed that opium and its alkaloids should be excluded from our list of hypnotics, because of their various dangers, and those who persisted in their use showed a paucity of therapeutic resource not warranted at the present time. The hyoscyamus derivatives appeared to be useful in the insomnia of the insane, but in daily practice were not to be chosen for obvious reasons. Of the oxygen derivatives of the hydrocarbons, amylene hydrate and methylal were

of limited use and untrustworthy. Paraldehyde was useful, but habit is formed in spite of the abominable odor which it gives to the breath; cases of delirium tremens from its use have been reported. Chloral was popular, but habit was readily formed, and its use was attended by dangerous and even fatal results which were frequently not to be foreseen. Chloralamide was almost absolutely safe and by far the best of the chloral derivatives. Chloralose had given rise to serious depression. Hypnal and hypnone were entirely untrustworthy. Of the sulphur derivatives of the hydrocarbons sulphonal was often delayed in its action, and fatal cases had occurred. He cited the cases of hæmatoporphyrinuria, presenting the symptoms of abdominal pain and vomiting, with fatal collapse. The exanthemata were common. In view of the indiscriminate use of this drug by the laity, he believed that its use by the profession should be discouraged. Trional is a far better remedy than sulphonal, although from this exanthemata are frequently seen. It is more rapid in its action, and the danger of hæmatoporphyrinuria more remote. By giving alkaline mineral waters during its administration, and omitting it for two nights each week, it did not so readily lower nutrition. Tetronal presents no advantages over trional. Of the urethanes, ethyl urethane, commonly known as urethane, is useful as a mild hypnotic and when a change is necessary. Chloral urethane, known as ural, as well as its alcoholic solution, somnal, presents all the disadvantages and none of the advantages of the substances of which it is composed. It is probably a mixture and not a chemical compound. Of the remedies from the vegetable kingdom he cited but one as a valuable hypnotic, and that could be used hypodermatically. That is pellotine, from the *Anhalonium Williamsii*, a Mexican cactus. In dose of one-half grain it gave quiet sleep of satisfactory duration. Discarding unsafe and unreliable and unsatisfactory drugs, he compares four, as follows: (1) Potency: paraldehyde, chloralamide, pellotine, trional. (2) Rapidity: pellotine, paraldehyde, chloralamide, trional. (3) Duration: trional (longest), chloralamide, pellotine, paraldehyde. (4) Habituation: pellotine (slight), trional, chloralamide, paraldehyde (considerable). (5) Safety: chloralamide, pellotine, paraldehyde, trional. By using these drugs judiciously, in no department of therapeutics can we add so much to the comfort and well-being of our patients. On the other hand, in scarcely another can we so readily lay the foundations for temporary inconvenience and lasting detriment.

MR. ALEXANDER MCPHEDRAN presented the contraindications and ill effects of hypnotics. From the bromides we have, in addition to the general cachexia, with loss of appetite, disturbed digestion, anaemia, loss of memory, mental apathy, and commencing paralysis and trembling of the extremities that may be developed from their immoderate use. There may also occur marked mental aberration and alarming homicidal tendencies. Sulphonal, even in moderate doses, may give rise to fatal results. Trional may produce various disturbances of consciousness, speech, and hearing, and of vision, loss of memory, and ataxia of movements in general. Paraldehyde has been followed by serious effects, great dyspnoea and collapse, marked delirium, with paresis of the functions in general, and the formation of a habit has been observed.—*British Medical Journal*, 1897, No. 1918, p. 853.

A Protective Collodion.—DR. KLEIN recommends for small wounds, and particularly for the physician's hands, a collodion to which 10 per cent. of balsam of Peru is added. This gives complete elasticity, a remarkable adhesive power, and a film which frequent washing cannot detach.—*Therapeutische Monatshefte*, 1897, Heft 4, S. 238.

The Results of Injection of Anti-streptococcal Serum in Twenty Cases of Malignant New Growths.—DR. J. ZIEMACKI has obtained his material from cultures of the streptococcus pyogenes with which goats were immunized; later, horses were employed. Of the twenty patients observed, six suffered from sarcoma; the remainder from carcinoma. The results were absolutely negative; in not a single instance was the growth of the neoplasm retarded. Of the twenty, twelve are dead, three dying; and of the others the result is unknown, but they are doubtless dead. The ulcerating growth did not clean up better under the influence of the serum so that it presented a more favorable appearance. In two instances the carcinomatous masses became softer as carcinomatous and sarcomatous masses do when they suppurate, which is the fate of all such old masses. On the contrary, there is no doubt but in the single instance of lympho-sarcoma repeated injections favored rapid dissemination of the disease about the original mass. Aside from the question of failure of the method, it can be certainly stated that in weakened and marantic individuals these injections are absolutely contra-indicated.—*St. Petersburger Medicinische Wochenschrift*, 1897, No. 35, S. 333.

The Sero-therapy of Tetanus.—MR. ED. NOCARD divides his subject into: (1) Curative measures. When tetanus has declared itself the antitoxic serum is without effect; it cannot prevent the fatal termination, whatever may be its antitoxic power or the dose injected. It cures only those who would have been cured without it. But in these cases it should be used, even if it does not decrease the mortality, for under its use the recovery takes place more speedily, the crises are less frequent and intense, and the convalescence is shorter. (2) Preventive measures: antitoxic serum injected in small dose at the time of the suspicious injury, whether accidental or surgical, or even a short time after it, prevents the onset of tetanus. The dose should be larger when it is administered late, and then it is better to give an intravenous than a subcutaneous injection. In this case it does not always prevent the onset of the disease, but it is likely to be mild and be promptly cured, even if the dose of toxin which has been received is a fatal one in test-animals.—*La Médecine Moderne*, 1897, No. 71, p. 566.

DR. MAX ENGELMAN has collected eighteen instances of this method of treatment; in these death resulted seven times. He concludes: (1) Both Tizzoni's and Behring's tetanus-antitoxins favorably influence the course of the disease. (2) They are harmless even in large doses. (3) The severer the symptoms the earlier they should be used. (4) The difference in the action of these antitoxins is not accurately determined.—*Münchener Medicinische Wochenschrift*, 1897, No. 34, S. 938.

The Use of Antitoxic Serum in the Treatment of Diphtheria.—MR. LENNOX BROWNE presents his second report discussing the mortality from

that disease in the hospitals of the Metropolitan Asylums' Board between January 1 and December 31, 1896. The number of cases treated with antitoxin was 2764, and 1411 without. In this report it is claimed that the mortality from diphtheria in 1894, prior to antitoxin, quoted as 29.6 per cent., has been lowered in 1896 to 20.8 per cent. As a matter of fact, this claim of the lowering of the "combined general mortality to a point below that of any former year" is obtained by the inclusion of results in cases not treated with serum in the mortality tables of those so treated. As a matter of sober truth, the death-rate of those treated with antitoxin in comparison with those treated without it should read as follows: 1894, 29.6 per cent., prior to antitoxin; 1895, 28.1 per cent. with antitoxin, 13.4 per cent. without antitoxin; 1896, 25.9 per cent. with antitoxin, 10.8 per cent. without antitoxin.

Obviously it will be answered that the lower mortality of the cases treated without antitoxin illustrates their extremely mild character. But according to the report the cases in which serum was not used have been, on the one hand, those which at the time of their admission were moribund, or so far advanced in the disease as to be beyond the reach of any treatment; or, on the other hand, doubtful and for the most part mild cases. An examination of these classes reveals that only 4 of 154 fatal cases were certified as mild on admission, 1 other did not seem very ill, whereas 63 are noted as having been in a moribund or hopeless condition on admission. So that if we make the same allowance for the cases not treated with antitoxin as for those treated with it, by eliminating these moribund cases, we should find that the death-rate in 1348 patients not treated with antitoxin was only 6.4 per cent. against 25.9 in 2764 treated with it. There remain of these 154 fatalities in the 1411 cases not treated with antitoxin 85, against which there is no note made as to the mildness or gravity on admission. Looking, however, to the stated cause of death in them, we have borne in upon us most conclusively the correctness of the view of those who hold that no case of diphtheria can ever be asserted to be mild until it is completed; and if belief in the innocuousness of serum treatment and its great benefit is as complete as is often announced, we cannot understand why, on any ground of common sense, apparently mild cases should be excluded. Lastly, there remain the doubtful cases; but one, so noted, died, and that refers to a patient aged seventy, with "carcinoma of the fauces." No change has taken place in the local treatment previously employed, and it might be added with truth that internal remedies have been by no means neglected. Thus, from the point of view of "general lowness of mortality," it cannot be claimed, even by the most ardent advocate, that all the credit for any reduced death-rate is due to serum-therapy. Indeed, with all the allowances claimed, the mortality of nearly 5000 cases treated with antitoxin in 1895 and 1896 is only $1\frac{1}{2}$ per cent. less than that for 1894, on about 3000 cases before antitoxin was introduced; and by no manipulation of figures can this fact be gainsaid. As to the effect of antitoxin upon children under five years of age, suffering from diphtheria, an analysis of the latter shows that 1346 were treated with antitoxin in 1896, with a mortality percentage of 32.2. Of 449 cases treated without antitoxin the mortality was 24.3 per cent. No less than 49 of these were moribund on admission; the corrected record should read 391 cases, death-rate 15.5 per cent. This is less than one-half of that experienced in

cases treated with antitoxin. And "the high fatality of diphtheria in the early years of life is notorious!"—*Medical Press and Circular*, 1897, No. 3030, p. 555.

Immunity and Sero-therapy in Yellow Fever.—DR. G. SANARELLI reports that the serum of blood from cadavers distinctly produces in cultures *in vitro* of the icteroid bacillus the phenomena of Grüber-Durham (arrest of motion and agglutination), but the intensity of this reaction is very variable. When inoculated in animals it does not show any preventive power toward the specific bacillus. Serum (transudates) obtained pure from the pericardial cavity possesses an agglutinating power much less than that presented by serum obtained by coagulation of the blood, and often fails entirely. Serum obtained from the blood of convalescents produces the Grüber-Durham reaction with great slowness, but manifests a weak preventive action in animals against the icteroid bacillus. As for the other serums, the antidiphtheritic produces agglutination of the icteroid bacillus with great rapidity; the antityphus in a partial manner; the normal serum of man and various animals does not produce it at all. Immunity for guinea-pigs against experimental yellow fever is only obtained after six or seven months of assiduous and delicate treatment. With dogs this immunity can be obtained after about two months. With horses the process is by no means of easy *technique* or of such rapid results as in the antidiphtheritic vaccination. Frequently accidents arise which imperil the life of the animal, and it is only after five or six months that it is possible to inject small doses of living cultures. Making use of the serum of immunized guinea-pigs, twenty-four hours before or after inoculation with virulent culture, it was found that this would prevent death, for of twenty animals treated, but three died between the tenth and sixteenth day, and the remaining ones recovered after a progressive emaciation which lasted about two weeks. Observations with dogs and horses gave similar results. For rabbits, which, on the contrary, are singularly susceptible to the icteroid bacillus, we have not a serum sufficiently active to save them. The preventive and curative action of the serum of guinea-pigs, dogs, and horses vaccinated against the icteroid bacillus should be considered as positively proven for animals. Other serums, as normal human, antidiphtheritic, antityphic, or antivenine (of Calmette), have not given any results in the way of a specific action against the microbe of yellow fever.—*Il Policlinico*, 1897, No. 20, p. 527.

The Treatment of Experimental Tuberculosis with Antitoxic Serum.—DRS. E. A. DE SCHWEINITZ and MARION DORSET report that the injection of the living culture produced substances antitoxic, to the disease, which will cure tuberculous animals; that the quantity of this substance can be increased gradually; that the treatment is, and will be for some time, still in the experimental stage. One point, however, must be remembered: that while it may be difficult to cure the disease in a guinea-pig, where its course is very rapid—a virulent bacillus requiring only from four to five weeks to kill—it might be much easier to check the disease when more prolonged in action, as in the majority of cases in man. Again, in addition to some form of specific treatment for the disease, man usually has the advantage of being

placed under the best possible surroundings as to diet, climate, etc., and every effort is made to aid the improvement of the patients, while with experimental animals the conditions are different. As to experiments with tuberculin, it may be said that these produce a serum containing antitoxic material, but the amount of this is small.—*New York Medical Journal*, 1897, No. 973, p. 105.

The New Tuberculin (Koch).—MM. LETULLE and A. PÉRON, from a study of six patients, offer the following: Two improved considerably, even without treatment. One, however, presented a new bacillary focus after immunizing treatment. Of two patients severely affected, one of galloping consumption, underwent no change. The other, genito-urinary tuberculosis, was improved, but only so far as concerned vesical pain, for the lesion continued to caseate and be evacuated during and after treatment. Of the remaining ones, one emaciated, while the other sensibly improved, but the improvement was not remarkable, and it is doubtful if it persisted; besides, the *bien-être* did not correspond to a real improvement, but to the well-known effect of suggestion. From these observations and the experiments recorded earlier in the paper, this new substance does not appear to be the immunizing substance so much desired.—*La Presse Médicale*, 1897, No. 69, p. 101.

The Treatment of Diabetes.—DR. E. MAUREL, from a careful study of results of a milk-diet in this disease, offers the following conclusions: (a) From the practical stand-point: (1) The treatment of arthritic diabetes, both preventive and curative, is entirely a question of the amount of ailment. (2) The regulation of the amount is easier with a milk-diet, and this should have the preference. (3) This diet also possesses the advantage, at the same time, of combating the majority of the diseases which so often accompany diabetes, especially those of the digestive and urinary organs. (4) His observations show the efficacy of this diet in the most severe complications of the disease, diabetic gangrene and threatening coma. (b) From the theoretical stand-point: (1) His observations confirm the view that arthritic diabetes is largely due to superalimentation. (2) They also give serious support to the view that diabetes is only a means of defence employed by the organism to diminish, by the elimination of the sugar, the substances destined for combustion, consequently the amount of products of incomplete combustion.—*Bulletin Général de Thérapeutique*, 1897.

Salophen in the Treatment of Articular Rheumatism.—M. L. GALLIARD, although not believing that the ideal medication has been discovered, has studied fifteen cases of various kinds of rheumatism. The drug failed in chronic polyarticular rheumatism. Of so-called gonorrhœal rheumatism, there was one success and one partial failure. In the subacute variety there was no result. Of nine cases of acute disease the results in three were good, three fairly good, and three moderate. In none was there an excellent result such as is found, under some conditions, with sodium salicylate. He concludes that it is in the acute variety that the good effects of the drug are manifested. It can relieve pain, reduce swelling, abolish the fever, and prevent visceral manifestations. It should be administered at the outset in daily amount of

ninety grains taken in six doses in starch wafers. It is always well borne; there is no malaise, nausea, vertigo, or ringing in the ears. It increases diaphoresis. There have been no marvellous results. In equal dose it is a little less rapidly efficacious than sodium salicylate.—*La Presse Médicale*, 1897, No. 56, p. 13.

The Treatment of Chronic Articular Rheumatism.—DR. MAX SCHÜLLER notes that, contrary to what might have been expected, these joints contain little or no fluid, and never pus. In connection with the condition which he described as early as 1893 as polyarthritis chronica villosa, which should be clearly separated from acute articular rheumatism, he has found a special bacillus which occurs as broad, short rods. In twenty-nine instances he has made use of repeated injections into the joint. Generally, the following formula was employed: Pure finely-powdered iodoform, 20; pure acid-free glycerin, 250–400; pure guaiacol, 5. This is to be injected with a syringe which has been treated in a steam sterilizer, and all aseptic precautions must be taken. Of the joints treated—one shoulder, five elbow, two hand, five finger, two hip, thirteen knee, and one foot—in sixteen the chronic inflammatory process and the villous mass completely disappeared. In the knee five or six injections were necessary, using two and one-half to four drachms of the preparation. Pain regularly, but fever seldom, resulted from the treatment, and these disappeared within two days. More rapid cure followed opening of the joint, after fixation, with removal of the diseased synovial membrane and of the villous mass. The wound was then sutured and the same material injected. The sutures were removed after eight or ten days, and the fixation apparatus removed. After about the same time motion was permitted, and, later, electricity, massage, inunction, and baths were employed. The results were absolutely normal, movable joints. Eleven knee, one elbow, two hand and radio-ulnar joints have been operated upon. In ankylosed joints a small portion of bone was removed. This operation, however, was reserved for the more severely affected articulations.—*Verhandlung des XV. Congres für Innere Medicin zu Berlin*, 1897, S. 127.

Eucain B. in Stomatology.—MM. DUMONT and A. LEGRAND make use of a 1 per cent. solution sterilized by boiling. They report seven observations, concluding that it is a good local anæsthetic, producing anæsthesia as rapidly as does cocaine, but which persists for a shorter period (about three times less), and that its feeble toxicity permits its safe employment in dental surgery even when practised upon children.—*Bulletin Général de Thérapeutique*, 1897, 18e liv. p. 545.

Eucain.—DR. M. G. T. GARCIA reports his observations upon the use of this drug in from 2 to 4 per cent. solutions in genito-urinary surgery, especially for introduction of sounds and urethroscopic examinations. In no case has he noted irregularity of pulse or respiration. It may be employed as a substitute for cocaine in all cases where hyperæmia is not contra-indicated. He concludes that it is less toxic than cocaine, while possessing an anæsthetic action at least equal to and often greater than the latter. Its solutions can be sterilized by boiling, and aqueous solutions are stable.—*Revista Mensual de Medicina*, 1897, No. 1, p. 18.

MEDICINE.

UNDER THE CHARGE OF

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The Relation of the Spinal to the Cranial Cavity.—NÖLKE (*Deutsche med. Wochenschrift*, 1897, No. 39), reports a number of cases from Quincke's clinic that throw an important light on the relation of the spinal and cranial cavities and the pressure in these as determined by lumbar puncture. In a number of cases in which this operation was performed, either a low pressure or a remarkable fall in the pressure was observed. As an example may be mentioned a case of suspected brain tumor, possibly of chronic serous meningitis. A high intracranial pressure seemed probable from the symptoms—headache, vomiting, optic atrophy. The spinal puncture showed at first a pressure of 200 mm. of water. The fluid escaped slowly, and after 5 c.cm. were removed the pressure fell to 10–40 mm. Respiration ceased suddenly and could not be restored. Autopsy revealed a marked chronic hydrocephalus, the ventricles containing over 80 c.cm. of fluid. At the base, pressing on the optic nerves, was a small tumor, and in place of the hypophysis was a soft tumor which had broken into the antrum of Highmore. The tumor had narrowed the foramen magnum and obstructed the foramen of Magendie indirectly, the total occlusion probably taking place during the operation. In other cases, notably in a case of simple hydrocephalus, it seemed as if obstruction was due to pressure of the brain-mass against the wall. In some cases the obstruction was spontaneously relieved. The sudden obstruction may explain the headaches sometimes noted after puncture, and also some cases of sudden death after that operation. Nölke also noticed striking differences in the amount of albumin in the spinal and cranial fluids, which further research may show to be normal.

A Case of Gastric Tetany.—BERLIZHEIMER (*Berliner klin. Wochenschrift*, 1897, No. 36) adds to the small number of cases of gastric tetany already reported. The patient was a man, aged thirty-five years, with dropsy of the gall-bladder and dilated stomach. From time to time tetaniform convulsions occurred. Trousseau's phenomenon was easily produced. There was trismus. The facial sign was not distinct. The stomach-contents gave a negative test for ptomaines. Injection of the contents in animals was negative. Autopsy showed abscess of the pancreas and compression of the ductus choledochus, with dilatation of the stomach due to stretching. An infectious origin of the tetany (there was peritonitis) is excluded. In a case previously reported from von Jaksch's clinic tetany followed paracentesis of the

abdomen. In the present case the gall-bladder had been aspirated, but not until after the tetany began.

The Spinal Changes in Pernicious Anæmia.—G. VON VOSS (*Deutsches Archiv für klin. Med.*, Bd. lviii. p. 489) has made a careful clinical and experimental study of this subject. From the clinical material examined, as well as a study of the literature, he draws the following conclusions: 1. The anatomical basis of the spinal degeneration in pernicious anæmia may be considered established. 2. Pernicious anæmia must be considered an etiological factor in the production of combined system disease of the spinal cord. 3. Vascular degenerations belong to the type of the disease in question, but are not the essential causes. 4. The frequently observed hemorrhages do not account for the origin of the spinal disease. 5. The question as to the cause of "pernicious anæmia," and the question as to the relation of the anæmia to the spinal disease are cardinal ones in any investigation of the subject.

After considering the possible explanations advanced, von Voss gives the results of some experiments made by him in order to see if induced anæmia could produce in animals spinal changes like those found in pernicious anæmia. As the result, he found that no typical changes could be produced in rabbits resembling those in man, nor could any alterations at all be produced in dogs and guinea-pigs, although the extent and duration of the anæmia were often very great. Von Voss, therefore, concludes that an as yet unknown poison is the cause of the peculiar spinal degeneration of pernicious anæmia, and that investigations of the metabolism in that disease are best calculated to clear up the subject.

The Aspiration of Stomach Contents in Artificial Respiration.—A. BROSCHE (*Deutsches Archiv für klin. Med.*, Bd. lviii. p. 604) publishes some interesting results, of value not only in legal medicine, but also in practice. His attention was directed to the subject by the case of a convalescent from diphtheria, who suddenly fell over on rising from the table. The physician who was called in kept up artificial respiration for some time, but without success. The most important post-mortem finding was the presence of food in the trachea and bronchi, the stomach also being full. Brosche carried out an extensive series of experiments for the purpose of ascertaining whether such an aspiration could occur after death, from artificial respiration, and found that it was by no means difficult, especially if the stomach is full and the method of respiration one which includes pressure on the abdomen to force up the diaphragm. It is easy to understand how, in a convalescent, heart-failure might occur as the result of an over-distended stomach, and how, in case artificial respiration had been carried out and aspiration of stomach-contents followed, the real conditions might be difficult to explain. In order to avoid such accidents, the author recommends the insertion of a rather stiff-walled stomach-tube of wide calibre to lessen the risk of aspiration in case the contents of the stomach be expressed, and the use of a method like Howard's, or, still better, Marshall Hall's. The stomach-tube also serves a useful purpose in preventing the tongue from falling back and obstructing the larynx.

Balantidium Coli and its Action in the Intestine.—JANOWSKI (*Zeitschrift für klin. Med.*, 32, p. 415) reports the case of a man with severe chronic diarrhœa. There was no evidence of dysentery, malaria, or tuberculosis. The symptoms began three days after an excessive meal, including a great deal of pork and various kinds of sausage, followed by a large quantity of water. Opium and bismuth had no effect, unless to increase the diarrhœa. There were six to eight large stools daily, without pain, but with borborygmi, and followed by a dull pain in the anal region. In the examination of the feces, enormous numbers of balantidium coli were found. The patient was given quinine by the mouth and per enema for five days, by which time the parasites disappeared entirely, and, the other symptoms being much less severe, the patient left the hospital. That the parasites caused the diarrhœa in the beginning the author does not claim, though it can hardly be doubted that they had an important part in maintaining the chronic course.

Janowski gives an account of the salient points in the history of balantidium coli. Since the first report of Malmsten, forty years ago, only fifty-five cases have been published. Thirty-seven of these occurred in Scandinavia, Finland, and Russia. There was diarrhœa in all but one of the cases, but its relation to the parasites is made probable in only twenty-five, and in one case even large numbers were present without any apparent effect.

On the whole, however, the parasites when present in human intestines are to be looked on as unwelcome or even dangerous guests, and are likely to be associated with obstinate diarrhœa. In many cases the infection was noted in persons who had much to do with swine, and since the balantidium occurs almost constantly as a harmless parasite in these animals, the relation seems very close. Janowski also thinks contaminated drinking-water a not improbable source. In treatment, either quinine, as used by the author in the case now reported, or salicylic acid internally and in enemata containing one gramme to the litre, should be given for several days or until the stools are free from parasites.

Alpha-naphthol as a Reagent for Free Hydrochloric Acid.—F. WINKLER (*Centralblatt für inn. Med.*, 1897, No. 39) recommends a new test for free hydrochloric acid, which is really a reversal of Molisch's modification of a well-known furfural reaction, and used by the latter as a test for glucose. Winkler uses either a 5 per cent. alcoholic or 10 per cent. chloroform solution of alpha-naphthol. To a small quantity of the suspected fluid a few granules of dextrose and a few drops of the naphthol solution are added. This is carefully heated. If hydrochloric acid is present a bluish-violet color appears, rapidly turning darker. Overheating masks the reaction. The grape-sugar may be added to the naphthol solution in the proportion of $\frac{1}{2}$ to 1 per cent., or one can use milk-sugar or even milk. Hydrochloric acid in the proportion of 0.04 per thousand may be detected by this method. It does not respond to lactic or acetic, but does to sulphuric or phosphoric acid. In testing stomach-contents the reaction may occur without the addition of dextrose from dextrose found in the stomach from starch.

Acute Yellow Atrophy and Cirrhosis of the Liver.—VON KAHLDEN (*Münch. medicinische Wochenschrift*, October 5, 1897) believes that cases of

acute yellow atrophy of the liver which are not rapidly fatal develop into typical examples of cirrhosis of the liver. Before dealing with this point, he reviews briefly the causes of acute yellow atrophy.

Whereas pregnancy is considered an important predisposing etiological factor, only a small proportion of the recently published cases show this association. -

Von Kahlden points out the relationship between acute yellow atrophy and epidemics of icterus, and mentions Meder's fatal case of acute yellow atrophy occurring in a soldier, who was one of fifty men who had suffered from jaundice in a barracks epidemic. Many other similar observations have been recorded.

Various poisons, of which the more important are phosphorus and arsenic, may cause the disease.

Of special interest are those cases which follow various infectious diseases. It has also been observed after osteomyelitis, erysipelas, diphtheria, phlegmon, septic gangrene, and streptococcus injections. The onset of acute yellow atrophy during the later stages of syphilis has been comparatively frequently observed. Meder states that eighteen or twenty of the reported cases have followed syphilis.

The association between infections with the bacterium coli communis and icterus or acute yellow atrophy has been more than once pointed out, particularly by French observers. Kamén found the bacterium coli communis in various internal organs in five fatal cases of Winckel's disease occurring in an epidemic in which six infants were attacked. Stroebe recently found the colon bacillus in the liver of a girl, aged twenty-one years, who died of acute yellow atrophy on the seventh day of the disease. It was proved in this case that the infection was through the portal vein.

Von Kahlden reports a similar case in a woman, aged twenty-eight years, who became suddenly ill on May 31, 1895, the patient dying on June 9th of acute yellow atrophy of the liver. Cover-slip preparations from the liver showed very numerous short bacilli with rounded ends, which were proved by the cultures to be the bacillus coli communis.

The subsequent changes in the liver in cases where acute yellow atrophy does not rapidly terminate fatally are then dealt with. Marchand found that the liver of a woman, who had six months previously had an attack of acute yellow atrophy, showed both macroscopically and microscopically a picture very closely resembling cirrhosis of the liver. Stroebe reports a similar case showing marked evidences of cirrhosis only four weeks after the onset of the acute yellow atrophy. Von Kahlden relates a case of his own occurring in a woman, thirty-four years of age, whose illness began with an osteomyelitis of the sternum leading to spontaneous fracture. Following the osteomyelitis a general staphylococcus infection developed. During the course of the illness, and three and a half months previous to death, the patient had marked jaundice, which was attributed to the occurrence of acute yellow atrophy of the liver. The liver presented at the autopsy, both macroscopically and microscopically, a picture very similar to that seen in cirrhosis of the liver. Von Kahlden believed that in this case there had first been an acute yellow atrophy of the liver followed by cirrhosis, which he believes is the usual course in those cases where the disease is not rapidly fatal.

SURGERY.

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The Surgical Treatment of Diseases of the Vermiform Appendix.—BATTLE (*British Medical Journal*, April 17, 1897) describes the following method of operation in cases of appendicitis and in exploratory operations on the abdomen, with the purpose of avoiding the danger of hernia through the scar left in the abdominal wall.

An oblique incision is made in the right iliac region with its centre corresponding to the point which, in the opinion of the surgeon, is probably that of the attachment of the appendix, and its length varies with the patient. The direction of the incision is that of the linear semilunaris, and is usually about midway between the anterior superior spine of the ilium and the umbilicus. After the division of the skin and subcutaneous tissue the incision is carried through the aponeurosis of the external oblique and the outer part of the sheath of the right rectus muscle; this part of the incision is about one inch from the external margin of the sheath. The rectus muscle is then drawn toward the middle line, having been separated from the inner surface of the sheath with the forefinger. When the edges of the wound are retracted, the deep epigastric artery will be seen lying on the posterior layer of the sheath running from below upward. The artery is easily avoided, and the posterior layer of the sheath (or the transversalis fascia), the subperitoneal tissue, and the peritoneum divided to the full extent of the wound. The use of retractors will bring the area of operation well within reach. The small intestines can now be pushed toward the middle of the abdomen, the region affected isolated, the appendix amputated by the coat-sleeve method, and the peritoneum closed over it with Lembert sutures.

The abdominal wound is then sutured in three layers of interrupted sutures from behind forward, the rectus muscle being replaced and intervening between the first and second layer, thus preventing the formation of a hernia.

The author admits that the operation is somewhat longer, but thinks the security attained fully compensates for that. The appendix can be readily reached through this incision as well as other parts of the abdomen.

Recurring Appendicitis.—In a study of this form of appendicitis and its treatment by removal of the appendix, SOUTHAM (*British Medical Journal*, April 17, 1897) reports a number of interesting cases and gives the following

as his indications for operation: Operation is indicated after two well-marked attacks of appendicitis, especially if the physical signs—more particularly a swelling in the situation of the appendix—persist in the quiescent period after the subsidence of the attacks.

In two of the three cases reported as operated upon after a second attack small collections of pus were found in the immediate neighborhood of the appendix, while in the third the appendix was distended with fluid and upon the point of rupture. In another patient, operated upon after a third attack, a hard, fecal concretion was found in the appendix, probably the cause of the preceding attacks. When an appendix is constricted or occluded, and especially when it is distended with fluid or contains a fecal concretion, there is always a risk of ulceration and perforation taking place, followed by the escape of its contents and suppuration around it. This, through adhesions surrounding it, generally results in a localized abscess, which may, however, sometimes form with acute symptoms.

The Treatment of Fractures.—After reviewing the various methods for the treatment of fractures, G. V. BERGMANN (*St. Petersburger Med. Woch.*, 1897, No. 14) summarizes his method of treatment in the following principles:

1. True adaptation is secured by extension, counter-extension, and careful manipulation.
2. Immediate attention is paid to the exudation of blood, especially about joints, by careful massage.
3. Fixation of the fragments. Splints of various forms may be employed, but those should be selected that are the cheapest and most readily placed in position with the certainty of producing good results.
4. For a proper fixation of the fragments it is necessary to fix the joints on either side.
5. In certain fractures it is necessary to employ extension apparatus, as in oblique fractures with marked overlapping of the fragments and shortening of the limb. The extension must be carefully applied to prevent decubitus and atrophy of the muscles.
6. The commencing atrophy must be counteracted by changes of dressings and by early massage.
7. Special care must be given to fractures involving joints. Since there is danger in these cases of loss of function, massage and passive motion must be commenced as soon as possible. The result in these cases depends very much upon the intelligence and good-will of the patient. In general, the prognosis is better in younger than in older persons.
8. In compound fractures the greatest care should be given to the surroundings. The hair should be shaved and aseptic conditions surround the entire area.
9. The early return of the limb to functional usefulness is secured by frequent baths, massage, and passive movements.

The Operative Treatment of Cancer of the Breast.—The operation which he adopts as the standard or minimum necessary to meet the conditions of cure is described in the Ingleby Lectures by MAY (*British Medical Journal*, May 22 and 29, 1897) as follows, and includes the removal of the

entire breast-gland, the integuments over the area of the tumor and for some distance around, all the para-mammary, fatty, and areolar tissue extending upward nearly to the clavicle, a clean dissection of the pectoralis major, or, what is better, the removal of the costo-sternal portion of the muscle, and, lastly, a clean dissection of the axilla, thus including all the tissues likely to contain the lymphatic channels. The suspected tissues are always to be removed entire in one piece; never cut into.

The incision should be well planned beforehand, of the oval type usually, or an ellipse, a widely open oval, from four to eight inches wide at its widest part, according to the size of the tumor and breast. A minimum distance of two inches from the margin of the tumor is advised. The dissection should include the sterno-clavicular portion of the pectoralis major, while the axillary space should be scrupulously clean. The supra-clavicular glands should be removed if they are infected, although their infection adds to the gravity of the prognosis. It is never necessary to divide the clavicle, but muscles may be divided and reunited by buried catgut sutures. There is little hope of a permanent cure if the axillary vein is so closely involved that its resection between ligatures is necessary, although this may be done without danger if need be.

The lateral wall of the axilla may be now cleared with careful avoidance of the muscular nerves. The posterior wall of the axilla is frequently the most difficult part on account of the hemorrhage from the subscapular vessels. These should be exposed and caught before they are divided. The nerves may be nearly always spared uninjured. The cutaneous nerves may be sacrificed without inconvenience.

The dressing of the wound is difficult, and great care should be taken to apply proper and uniform pressure if rapid healing is attained. The author uses sterile gauze and any absorbent wool.

The mortality from this operation is remarkably low. He does not think it should exceed 2 per cent. from causes proper to the operation. He has not had a death in seventy-six cases, but one of his patients died from intestinal obstruction three weeks after operation.

A small gap may be relied upon to fill up quickly without suppuration if the wound be kept dry and aseptic. He has had some success in primary skin-grafting, but it is uncertain. He has on one occasion used a piece of the redundant skin which is cut away near the axilla. It is to be stripped of all fat and tissue, and kept in warm boric lotion till wanted. It should be shaped to the gap which it should nearly fill, and should be pressed down firmly, so as to maintain close apposition to the raw surfaces. Operative grafting after eight or ten days is the most successful, a strip being taken from the inner side of the arm or thigh, but on many grounds it is objectionable.

If we find during an operation that the highest axillary gland is involved so that it is not possible to pass beyond the limits of the disease, what are we to do? The author has no doubt, under these circumstances, the posterior triangle of the neck should be opened and cleaned of its glands as an addition to the ordinary operation. There is a reasonable chance of getting beyond the limits of the disease. The incision may be prolonged upward over the clavicle, but it is not necessary to divide or resect the bone, as has been done by some operators.

The author shows by tables that there has been a marked and gradual improvement in the number of cases as the operation has become more thorough and radical. The percentage of cures in 1876 was 4.7 to 11.8, while in 1896 it was 42.5 per cent. of cures.

Of his own cases, he has full reports up to date of forty-four private cases. Those operated on over three years are twenty in number; of these seven are now alive and free from any sign of disease; eleven have died from it, and two are alive, but show signs. Out of thirteen patients in whom the disease has appeared it was solely internal in seven.

Of the more extensive operations the author says there is no conclusive evidence that any corresponding advantage accrues from some of the more recent developments of the operation, and he is of the opinion that the utmost benefit of which it is capable may be conferred in a large majority of cases by the operation he describes. The cases in which this will not suffice are probably unsuited for operation.

Of the clinical varieties the medullary cancer is most unfavorable, and there is no chance except in very early operation. Of all the unfavorable modifying conditions he thinks rapidity of growth the worst. The actual duration is by no means the only criterion of the disease or its stage. A large tumor of the tuberous form, of slow growth and unattached, has a much more favorable prognosis than an infiltrating medullary one in its earliest stages.

At the other extreme is the small, chronic, dry infiltration of shrivelled and aged women, though not confined to old women. Opinions differ as to the propriety of operating on atrophic cancer. In his opinion it is a question of the stage of the disease. In an early stage they are most favorable of all, and should certainly be removed. Later, where there is any notable skin infiltration or attachment to muscles, the most radical operation is not only ineffectual but harmful. In Paget's disease he would advise immediate operation in every case of chronic eczema or ulcer of the nipple, even though no tumor is perceptible, as the relationship between this and cancer is constant. In all his cases the ulceration preceded the tumor by several years. In two of them the tumor was limited to the nipple, and of the kind known as duct cancer, and preceded by a bloody discharge from the nipple—a symptom of very grave significance.

Secondary operations are only advisable when the growths are small, solitary, and freely movable.

The complete operation should be performed in every case where operation is undertaken.

The limits of operation for cure and the non-operable cases he classifies as follows: Non-operable: 1. Large medullary cancer. 2. Scattered tubercles in the skin and œdema. 3. Internal metastases of all kinds. 4. Œdema and solid enlargements of the upper limb. This is a manifestation of the disease which he would absolutely let alone.

Among the debatable cases he includes:

1. Enlargement of the supra-clavicular glands. He has hitherto regarded this as an absolute contraindication, but is inclined now to extend the field of operation to some of these cases, clearing the supra-clavicular fossa as an addition to the ordinary operation. He would limit it, however, to small and movable tumors or when the highest axillary gland is infected.

2. Cancer in both breasts. It is rarely desirable to operate, especially if some time has elapsed between the appearance of the two tumors.

Diagnosis: Early diagnosis is of the utmost importance, and is only to be attained by a careful, full examination of the breast, with bare chest and careful comparison. Students are often taught only to recognize late stages. Cases of chronic hyperplasia and tense cysts are the most difficult. The latter is distinguished by its mobility, globular outline, and verified by the exploring needle, which should never be overlooked. Chronic mastitis is more difficult; the thickening is sensitive to the touch, firm, and elastic, but the outlines are more diffused than in cancer. On pressing the mass against the chest-wall the induration and sense of tumor disappear. Then, again, the area of breast occupied is more diffused and larger, or both breasts may be similarly affected. The same sort of dimpling may occur as in cancer, but this is quickly followed by fluctuation and suppuration.

A preliminary incision may be necessary to demonstrate the diagnosis before proceeding to a wide operation, but the wound must be rendered antiseptic, packed with gauze, and a new knife employed for the operation, giving the patient the benefit of the doubt in fear of autoinfection.

The hope of improvement lies in greater improvement in operation, but more still in a greater power to diagnose in the very early stages of the disease.

The Treatment of Spinal Curvatures in Pott's Disease by Forcible Extension.—MÉNARD (*Gaz. Heb. de Méd. et de Chir.*, May 30, 1897), after a careful study of the pathological conditions resulting from this disease, shows that this method of operating is without scientific foundation, that it cannot be based on anatomical grounds or upon experimental knowledge obtained by work upon the cadaver.

Besides the injury of no one knows how grave a character that this violent treatment may produce, there is no reason to believe that there can be a permanent cure obtained, for pathological specimens obtained at various stages of the disease show that no new growth of bone occurs to take the place of the bone destroyed by the disease, and there is no growth which can fill up the gap left where the vertebrae have been destroyed and give a sufficient solidity to the spinal column.

The author, therefore, concludes that this operation has no foundation except in theory, is dangerous to the patient in its performance, and has neither given results that prove its value nor has to back it pathological facts which would lead one to suspect that it will give the desired results to produce cures.

The Treatment of General Septic Peritonitis.—Since adopting as a routine procedure the intrainstestinal injection of sulphate of magnesia the results of operation have been so much more favorable than those of former years that McCOSH (*Annals of Surgery*, June, 1897) cannot but believe that, in a measure at least, this improvement is due to the injection into the small intestine of a saline cathartic. There may have been other changes in the mode of operation and technique, but the author's former experience leads him to place the credit to this special modification of treatment.

During the past year he has operated on eight cases of general septic peritonitis. One of these died as the direct result of the peritonitis, one died from lung complications five weeks after operation, five recovered and remained well, and one is still in the hospital convalescing.

There were two other cases that came in moribund that were not operated upon. The cases operated upon were not selected, but were the general run. In six cases a gangrenous appendix was the cause, in one a perforating gastric ulcer, and in one a septic uterus. The histories are reported briefly. The details of the operation may be summarized as follows:

1. Chloroform is employed as the anæsthetic.
2. A free incision is generally made five or six inches in length. Its situation varies according to the organ which has excited the peritonitis. The purulent fluid is allowed to flow out, its escape being often aided by turning the patient on the side.
3. As a rule, the intestines are allowed to escape from the abdominal cavity into hot towels held in the hands of assistants (the patient being generally turned on the side). In certain cases, where the distention is enormous and where the heart's action is very weak, any considerable escape of intestinal coil is prevented. Where possible, however, even at great risk, the intestines are removed, and, if well protected by hot towels, he has not found the evisceration increases to any great extent the shock of the operation. If the distention is such that their return is impossible, he does not hesitate to open the ileum and allow gas and feces to escape. The openings are closed by Lembert sutures. He has never seen any reason for establishing a temporary artificial anus by suturing the gut to the abdominal wall.
4. The cause of the peritonitis is removed. If it be an appendix or tumor, it is extirpated. If it be a perforation, it is sutured.
5. The intestines and the cavity of the peritoneum are thoroughly irrigated with hot normal salt solution at a temperature of 110° or 112° F. or over. A soft-rubber tube is passed about among the intestines, or they are well douched if they are outside of the abdomen. Irrigation is preferred to the swabbing by gauze pads or sponges, as the author fears injury to the peritoneum, which will produce a chance for absorption of septic material. A considerable amount of the salt solution is allowed to remain in the abdominal cavity for the purpose both of stimulating the heart and of favoring intestinal drainage.
6. Sulphate of magnesia is injected, through a hollow needle attached to a large aspirating syringe, into the small intestine at a point as high up as possible in the jejunum or ileum. A saturated solution containing between one and two ounces of the salt is used. The needle puncture is closed by a Lembert suture.
7. The peritoneal cavity is drained generally by four or more strips of sterile gauze thrust in different directions among the intestines, or other forms of drainage are used.
8. The abdominal wound is but partly closed by sutures. The edges are not closely approximated, but are generally partially drawn together by two or three silkworm-gut sutures, between which and the intestines is placed a compress of gauze. A wound that gapes somewhat affords freer exit for the escape of peritoneal secretions.

9. After the return of the patient to bed, if the condition of the stomach will permit, a ten-grain dose of calomel is given. If chloroform has been used, this will generally be retained. Rectal stimulation is used for the first twenty-four hours.

OTOLOGY.

UNDER THE CHARGE OF

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Elephantiasis of the Auricle.—HAUG reports the occurrence of elephantiasis of the right auricle in a girl aged twenty years. Ten years previous to the time Haug first saw the case the girl had had whooping-cough, during which hemorrhages from the left ear and extravasation of blood beneath the integument of the auricle took place. The long diameter of the enlarged auricle, measured from the spina helix to the lobule, amounted to $12\frac{1}{2}$ cm., and the transverse diameter, from the outer edge of the helix to the antitragus, to 7 cm. The breadth of the lobule amounted to $4\frac{1}{2}$ cm.

Microscopic examination of a small piece revealed that the enlargement of the tissues consisted in a lymphangio-fibroma with hyperplasia of the cartilage and the perichondrium.—*Archiv f. Ohrenheilk.*, vol. xliii., Part I.

Myxo-cysto-fibroma of the Cartilaginous Auditory Canal.—HAUG also reports the occurrence of the above-named growth in the auditory canal of a man, aged thirty-eight years (*Archiv f. Ohrenheilk.*, vol. xliii., Part I.). The growth had been increasing in size for four years, had not been preceded by discharge, and had finally attained the size of a cherry. Within six months a slight, fetid discharge had set in, but the hearing had not been much affected.

The entire growth was removed with a cold wire snare. This was not followed by much hemorrhage. The tumor measured $2\frac{1}{2}$ cm. in length. The membrana tympani was found to be intact and the hearing good.

Removal of Foreign Bodies from the Ear.—HUMMEL makes the following deductions respecting the relation sustained by the external auditory canal to foreign bodies in it, and gives some rules for the removal of such obstructions from the ear:

1. The relation of the normal ear-canal to inanimate foreign bodies is entirely without reaction—*i. e.*, the foreign body in the ear does not, *per se*, endanger the integrity of the ear.

2. Every hasty endeavor at removal, therefore, is not only unnecessary, but can become very injurious.

3. In all cases not previously interfered with (with very few exceptions), the foreign substance can be removed from the ear by means of syringing.

4. The general practitioner should never employ anything but the syringe, in his endeavors at removal of foreign bodies from the external auditory canal.

5. An instrumental removal of a foreign body from the ear could be effected only by one fully able to examine the ear with an otoscope and acquainted with every operative manipulation in this region.—*Münchener med. Wochenschrift*, No. 17, 1897.

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Acute Otitis Media in Infants.—Acute otitis media in infants is often confounded with cerebral disease, and hence escapes proper attention and treatment. In alluding to this form of disease, SIR WILLIAM DALBY (*British Medical Journal*, July 24, 1897) points out that in the case of infants the constitutional symptoms and demeanor of the little patient as indicating pain of an acute and agonizing character, or pain prolonged over many days, are the sole evidences within our hands of ear disease. The heightened temperature alone is not sufficient guide as to the necessity of paracentesis, and sometimes inspection of the drum-membrane will not show this necessity. "In a large proportion of cases leeches and hot fomentations will cut short inflammations of the tympanic cavity, but it would be safe to adopt the rule that when they do not (for if they relieve, they do so at once), a vertical incision should be made in the posterior section of the membrane." The incision does no harm, Dalby says, even if no pus is found pent up in the drum-cavity. Again, "in the infantile forms of this inflammation (not connected with the exanthemata), the process is often slow, subacute, the case dragging on day after day without the membrane giving way."

[These delays are dangerous, as a week's delay in rupture of the drum may lead to damming back of the pus, through the posterior wall of the drum-cavity, into the cerebellum, with fatal termination, as in a child of six years observed by your reporter.]

J. H. MARSH (*British Medical Journal*, July 24, 1897), in writing of this same important subject, thus tabulates the symptoms which should suggest the ear as the cause of the illnesses often attributed to other sources: 1. The child constantly endeavors to rub the affected ear. 2. It utters a sharp cry of pain on pressure being made below the meatus. 3. It refuses to rest its head on the affected side.

The same author states that "the clinical signs which would suggest that the lesion had a tuberculous origin are: 1. A slow non-sthenic onset. 2. Early glandular enlargement. 3. Early facial paralysis. 4. Resistance to the ordinary measures of treatment. 5. The presence of other tubercular disease. These cases require the establishment of a free opening into the middle ear through the mastoid."

[This last-named procedure *should not* precede removal of the carious and necrotic ossicula. The latter operation will generally check the suppuration and do away with all necessity for opening the mastoid. If the mastoid is opened in such cases, and the carious ossicula are left in place, as I have seen done, suppuration with all its attendant risks of deeper lesions will continue, to stop only after a removal of the carious ossicula.]

E. POXFICK (*Berlin, klin. Wochenschrift*, September 29, 1897) points out that in children under four years of age great confusion in diagnosis often arises

in the presence of a gastro-enteritis, symptoms of which may be mingled with those of an acute otitis media, or which may depend more upon the otitis media than upon the gastro-enteritis, though the otitis media may not be recognized promptly. Often, in fact, the latter disease is discovered accidentally either by observing a discharge from the ear and improvement in the symptoms of the gastro-enteritis, or by touching the auricle or the region near it, when the latter is found to be tender and painful to the touch. Treatment of the ear will be followed by recovery in all respects, in most instances, if the aural treatment has not been deferred too long.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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Diphtheritic Conjunctivitis.—MYLES STANDISH (Boston) finds that there are many cases of diphtheritic disease of the eye which do not present the classical clinical picture of so-called diphtheritic conjunctivitis—that many more of the destructive processes are diphtheritic than had been supposed.

He urges the importance of early bacteriological diagnosis, for the reason that in his experience the cases treated early with antitoxin run a milder course, and the cornea is generally saved, with resulting preservation of vision. He reports three cases, and, from these and other cases he has seen, draws the following conclusions:

1. In all cases of purulent conjunctivitis the diagnosis should depend upon the bacteriological investigations, and not upon the clinical appearance.
2. That diphtheritic conjunctivitis may be present in localized areas without the conjunctiva being affected as a whole.
3. That ulcers of the cornea with exceedingly rapid necrosis of the corneal tissue may be due to infection with the Klebs-Loeffler bacillus.
4. That antitoxin favorably affects both the conjunctival disease and the corneal necrosis.—*Ophthalmic Review*, vol. xvi. p. 133.

Double Optic Neuritis in Enteric Fever.—C. BRAINE-HARTNELL (London) reports a case of enteric fever running quite a regular course in a boy, aged eleven years, who upon the sixteenth day showed inequality of pupils, with marked double optic neuritis. The diagnosis had been undecided as to enteric fever or meningitis, there being an absence of eruption, but

little diarrhœa, and irregular temperature. The discovery of the optic neuritis inclined the diagnosis to meningitis. But two days later the boy died, and the post-mortem examination showed distinct inflammation of Peyer's patches and the solitary follicles, but nothing in the brain to give rise to optic neuritis.—*British Medical Journal*, 1897, p. 1344.

The Treatment of Vernal Conjunctivitis.—DARIER (Paris) says the treatment of spring catarrh may be summed up as follows:

Soothing remedies, bathing with water, or water in which carbolic acid or creolin has been dissolved. By these means is obtained the most rapid and marked relief. These may be employed three or four times a day.

Generally, applications of nitrate of silver or sulphate of copper are not indicated, and do good only when the stringy, muco-purulent secretion is pretty abundant. In the pericorneal form of spring catarrh the best treatment is massage of the cornea with mercurial ointment, made up with lanolin. It is true that after three weeks' or a month's daily massage of the cornea with the ointment the characteristic pericorneal circular swelling does not entirely disappear; but no other treatment has given results equal to or as favorable as this.

For the tarsal form of the disease, in those comparatively recent cases in which the papillary hypertrophy is not excessive, scarification, with the lines of incision close together and crossed, is of very considerable service. These scarifications are repeated every four days for several weeks. After scarification the more exuberant papillæ may be removed with the curette. This treatment brings about a relative cure in two months, but it may be necessary to complete the cure by repeating the treatment for two or three seasons.—*Annals of Ophthalmology*, July, 1897.

Syphilitic Neuro-retinitis.—LYMAN WARE (Chicago) has not seen a single case of syphilitic neuro-retinitis following thorough and prolonged antisyphilitic treatment.

It never terminates in spontaneous recovery. Without treatment it is sure to end fatally. The most skilful treatment, even begun at an early stage of the disease, may prevent a fatal termination in many cases, yet often life is rendered miserable and sad by partial or total blindness. Large doses of potassium iodide are of value in arresting the disease in some severe and dangerous cases, but they do not compare with mercury in eradicating the syphilitic poison. The manner in which the mercury should be used is of secondary importance. For years he relied mainly on inunctions, but recently has resorted to hypodermic injections of the preparation proposed by Althaus, which consists of metallic mercury, 1 part; lanolin, 4 parts; carbolic oil (2 per cent.), 5 parts.

The usual dose, five minims, may be gradually increased to ten, giving an injection once a week, in the region of the glutei muscles.—*Archives of Ophthalmology*, 1897, p. 345.

Effects of Strain of the Accommodation.—W. SCHOEN (Leipzig) thinks chorio-retinitis of the ora serrata comes on with other symptoms in eyes with

strained accommodation, and appears in an acute or a chronic form, the former accompanied often with opacities of the vitreous and scleritis.

The causes are hyperopia and astigmatism according to the rule. The results are astigmatism against the rule, equatorial cataract, accommodative excavation, latent convergent strabismus, and chorio-retinitis of the ora serrata.

When the ora serrata is displaced forward the zonular fibres slacken, the lens pushes the iris forward, and the width of the chamber-angle is lessened. These changes, according to their extent, fall into four categories: 1. The normal position of the iris and lens. 2. Ordinary accommodation, the outer half of the iris concave, the inner half convex, the anterior chamber shallower in the centre. 3. Pushing forward of the entire iris, more or less noticeable prolapse of the lens, convexity of the entire surface of the iris, shallowing of the entire anterior chamber. 4. Apposition of the iris to the cornea, obliteration of the anterior chamber, absolute glaucoma.

The pressing forward of the lens leads to an increase in refraction; and the tilted position which it may assume leads to acquired astigmatism, usually against the rule. The author's cases of glaucoma have almost exclusively been in eyes with uncorrected hyperopia or astigmatism, and he believes that the correction of the refractive error would, in many cases, have prevented the development of glaucoma.—*Archives of Ophthalmology*, 1897, p. 428.

DERMATOLOGY.

UNDER THE CHARGE OF

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Massage in Skin Diseases.—WILLIAM TIBBLES (*British Medical Journal*, January 9, 1897) speaks in favor of this method of treating acne, psoriasis, and various localized indurations. Massage as actually performed is, however, an unpleasant duty, and hence is not carried out so regularly as it ought to be. In place of the hand an India-rubber roller (such as the ordinary roller employed in photographic work) is recommended. It is easy of application and can be applied largely by the patient.

Impetigo Contagiosa Vegetans.—HERXHEIMER (*Archiv für Dermatologie und Syphilis*, Band xxxviii., Heft 2), in reporting three cases of impetigo contagiosa attended by the formation of vegetations at the site of the pustular lesions, concludes that these proliferations possess no specific significance, since they are found in very different forms of pustular and vesicular dis-

eases. He found, in studying these vegetations, that in a zone of the rete lying above the columnar cells, the epithelium is so altered in its formed elements that it no longer takes up stains. This peculiarity, the author thinks, may be useful in microscopic diagnosis, its presence probably indicating the proliferation of the skin after certain eruptive diseases.

Acute Miliary Tuberculosis of the Skin with Acute Miliary Tuberculosis of the Entire System.—The following case, noted by OTTO LEICHTENSTERN (*Münch. med. Wochenschrift.*, January 5, 1897), illustrates the rare observation that miliary tuberculosis of the general system may give rise to a disease of the skin of the same nature. Subject, aged four years, had measles four weeks before entering the hospital. There were no hereditary tendencies. On admission there were high fever and bronchial symptoms. Pulse 120 to 144. The skin was then normal. Loss of strength and emaciation set in, and at the end of six weeks' illness the child died of tubercular meningitis. The autopsy showed that the lungs, pleura, liver, kidneys, mesentery, and retro-peritoneal glands were affected. The spleen was enlarged; heart normal. The second week after patient's admission to hospital a disease of the skin appeared on the face, consisting of a limited number of small, bright-red, circumscribed, acuminated, hempseed-sized papules. As the disease advanced new ones formed on the back and the upper extremities, and later on the lower extremities, but sparingly. Most of them in from eight to fourteen days disappeared by drying up and desquamating furfuraceously; on the summits of others minute vesicles formed which dried quickly and desquamated; still other papules showed pustulation on their summits, but in no instance to such an extent as in pustular acne or impetigo. Pustulation was confined to the summits of the lesions. These, like the other lesions, dried up quickly and desquamated. In many respects the eruption resembled a sparse, disseminated, small, miliary papular and pustular syphiloderm. New ones appeared, while older ones disappeared. There was never any tendency to group. On microscopic examination the epidermoidal part of the papules showed a lamellated appearance, but the most important primary changes were in the papillary layer of the corium, where they formed 1 to 2 mm. broad lenticular tubercles, containing numerous tubercle bacilli. The epidermoidal structure seemed to be secondary. By degrees, under observation, following the cutaneous eruption of miliary tuberculosis there occurred an acute, multiple swelling of the lymph-glands of the neck, axillæ, and groins. In the fourth week of the disease on the mucous membrane of the mouth and on the tongue there appeared a miliary eruption, which rapidly broke down and changed into superficial ulcers covered with a speckled deposit.

The Anatomy of Lichen Ruber (Planus, Acuminatus, and Verrucosus).—JOSEPH concludes (*Archiv für Dermatologie und Syphilis*, Bd. xxxvii., Heft 1), from a study of the anatomy of the various forms of lichen, that we are justified, not only upon clinical but also on anatomical grounds, in asserting the unity of lichen ruber. To lichen ruber belong three symptom-groups—the planus, acuminatus, and verrucosus forms. The author believes that his investigations show a close anatomical connection between the different

clinical symptoms of the lichen process. Inflammation, beginning in the corium about the bloodvessels and extending to the more superficial layers, is the primary change; secondarily, hypertrophy of the epidermis and hyperkeratinization follow. A cure of lichen ruber verrucosus was obtained through the local application of chrysarobin-traumaticin (1 : 10) without the employment of arsenic internally.

The Permeability of the Skin.—MANASSEIN (*Archiv für Dermatologie und Syphilis*, Band xxxviii., Heft 3), who had the opportunity to examine sections of skin obtained from a syphilitic subject who died suddenly some days after using mercurial inunctions, arrives at the following conclusions concerning the permeability of the normal skin: The living, uninjured skin of mammals is impermeable for salves with the usual inunction methods. With the usual inunction methods, salves may penetrate to varying depths into the hair follicles.

OBSTETRICS.

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Cleidotomy in Labor Delayed by Excessive Size of the Shoulders, the Head Presenting.—In the *Archiv für Gynäkologie*, Band liii., Heft 3, 1897, VON HERFF urges the value of cutting the clavicles of the fetus in cases where birth is difficult or impossible because of the excessive size of the shoulders. This procedure has been advocated by some in breech labor when it was found impossible to extract the child because of its excessive size. He narrates the following interesting cases in which the head presented and in which cleidotomy was performed.

The first was that of a multipara whose child presented in labor by the face; progress was not made, and the child perished from birth-pressure. An effort was made to apply forceps, but the instrument slipped. The head finally emerged, and showed that the fetus was anencephalic. As the trunk did not follow, examination revealed the fact that the shoulders were excessively broad, and were transversely above the pelvic brim. The fetal thorax was also excessive in size. An effort was made to bring down the posterior shoulder, but this failed. A perforator was then introduced along the fetal back, some of the upper ribs were separated, and one of the clavicles broken; the shoulder at once descended, and the fetus was delivered without difficulty.

A second case was that of a multipara who had a flat rachitic pelvis, in whom labor was delayed by disproportion between fetus and maternal pelvis.

The head was delivered by forceps, but all efforts at traction upon the shoulders failed to cause the child to emerge. The shoulders were impacted above the pelvic brim in the right oblique diameter. It was impossible to dislodge the child or to bring down an arm. Accordingly the clavicle of the posterior shoulder was broken with a perforator, and the shoulder descended. The trunk was then brought deeper by a blunt hook, the arms extracted, and the child delivered. It had perished before extraction, from birth-pressure.

[The editor recalls a case very similar to the latter, in which a foetus of excessive size was contained in a normal pelvis. The head was extracted by forceps, but the shoulders could not follow. In this case the clavicles were fractured while the operator hooked his fingers into each axilla in succession, and delivered the child by strong traction. Although it was born living, it survived but a few days, dying from the results of birth-pressure. This procedure is virtually embryotomy, and it must be rare for a child to survive a birth so difficult as to render cleidotomy necessary.]

Practical Asepsis and Antisepsis in Obstetrics.—RICHARD BRAUN and HÜBL, in the *Archiv für Gynäkologie*, Band liii., Heft 3, 1897, contribute a long and interesting paper, giving the methods employed in the obstetric clinic of Gustav Braun at Vienna. While a portion of this paper is purely critical and argumentative, it contains a statement of practical methods and results which is of interest.

In measuring the temperature of the patient, the writers prefer to use the thermometer in the axilla, and they give many good reasons for not measuring temperature in the rectum. They rely in all cases upon thoroughly cleansing the external genitals with 1 per cent. lysol solution, which is applied by douching, and not by rubbing with cotton. A sterile pad of cotton is then placed over the vulva. In judging of the condition of a puerperal patient, they consider the pulse-rate of great importance, and especially the relation existing between the pulse and temperature. Those who deliver patients are obliged to clean the hands thoroughly with soap and brush in hot water for three minutes, then cleaning the nails, and again brushing the hands with soap and water two minutes longer. While still wet, the hands are brushed vigorously in an alcoholic solution of bichloride for three minutes, eight minutes in all being occupied in this process. Patients are delivered lying upon the left side, the hands of the operator being repeatedly immersed in a bichloride solution contained in a basin at the bedside. The perineum is covered with a sterile towel during delivery.

The sanitary surroundings of the clinic are not the best; there is deficient air-space, the building is very old and inconvenient, and there is a lack of many of the modern facilities for securing good hospital hygiene. In view of these facts and the large number of cases treated, the authorities of the clinic do not feel justified in relying simply upon asepsis, but follow also strictly antiseptic precautions.

During the year 1895, 2956 labors occurred in the clinic, and in classifying these the minor obstetrical proceedings, such as rupturing the membranes, pressing the head into the pelvis, replacing a prolapsed fetal part, and removing retained membranes are reckoned among normal births. In the same

category are a case in which vaginal fixation of the uterus had been performed, and also the case of a girl aged fourteen years and one month, delivered of a good-sized child by spontaneous labor. The material of the clinic was very thoroughly classified and tabulated. From these tables practical deductions may be drawn. In but six cases was version made to secure a better delivery through contracted pelvis. Such version is especially avoided in primiparæ, while in multiparæ it is most successful in cases of flat pelvis. It naturally follows that the forceps is used not infrequently at the brim of the pelvis. The ground is taken that it is practically impossible before active labor sets in to give a prognosis as to the possibility of spontaneous delivery. In contracted pelvis the obstetrician should always await the trial of labor with the head presenting, remembering that craniotomy upon the after-coming head is more difficult than when the head presents. The fatality of rupture of the uterus is well illustrated in the fact that four cases were admitted requiring abdominal section, and each of the patients succumbed. In face and brow presentations the majority terminated spontaneously, and it was remarkable that but little injury to the perineum and pelvic floor happened in these labors.

As regards the care of puerperal patients, vaginal douches of 1 per cent. lysol were given if the lochia became foul, and ergot was also administered. Where the perineum had been sutured and did not unite, the stitches were removed and the surfaces painted with tincture of iodine. Portions of membrane and placenta retained in the uterus were delivered by forceps when they began to emerge through the cervix. Septic mortality and morbidity were much greater from cases examined outside the hospital before admission. The percentage of septic mortality was $\frac{6}{100}$ of 1 per cent. in cases treated in the clinic, while in cases delivered outside the clinic the mortality-rate from sepsis rose to $\frac{5.6}{100}$ of 1 per cent.

[It is interesting to observe in this large clinic the success of the simple essentials of antiseptics: first, the strict avoidance of all unnecessary manipulation within the vagina; second, cleansing of the external parts by douching rather than by scrubbing; third, the use of a simple but sterile occlusion dressing; and, fourth, the careful antisepticizing of the hands. In this process we note that the hands are carefully scrubbed free from soap, and when wet are scrubbed in bichloride and alcohol. This method of cleansing remains the best available for the purpose. These methods, which gave such good results in a large clinic in which midwives are trained, can be perfectly applied in obstetric hospitals and with private patients. —Ed.]

A Discussion of Hyperemesis Gravidarum.—At the Montreal meeting of the British Medical Association a discussion of this subject elicited much of interest (*British Medical Journal*, 1897, No. 1921). Among others, GILES, of London, had analyzed 300 cases in the London Lying-in Hospital to determine the cause of the ordinary vomiting of pregnancy. He found in 33 per cent. of cases there was no vomiting at all. In 50 per cent. of cases there was no vomiting during the first three months of pregnancy. Among primiparæ there was a close and constant relation between vomiting of pregnancy and previous dysmenorrhœa. Vomiting during the latter months was

frequently associated with anniotic dropsy, twins, or an unusually large child.

As regards the treatment, the bromides were considered of value administered by the rectum or by the mouth. Dilatation of the cervix, either by the finger, by packing with gauze, or by dilators, has proven valuable. All those who discussed the question agreed that delay was too often practised in emptying the uterus, and that no hesitation should be felt in resorting to this procedure so soon as other treatment was not promptly effective.

[As illustrating the fact that the causes which produce dysmenorrhœa may bring about pernicious vomiting, we recall three cases of marked ante-flexion of the uterus in which the patients had habitually suffered great distress at menstruation. One of these came to autopsy, when a cyst was found in the cervix; in another premature labor came on, and the cervix could not be dilated without extreme difficulty, while in a third the ante-flexion gradually became less and the pregnancy was uninterrupted.—ED.]

Labor Complicated by Abnormalities of the Cervix and Vagina.—In the *British Medical Journal*, 1897, No. 1921, CAMPBELL describes the case of a vigorous young primipara whose labor was ineffectual. A large red swelling protruded from the vagina, and was found to be the cervix, although no os could be detected. Under an anæsthetic a careful search found a red spot on the posterior aspect of the tumor. This was readily scratched through with the finger-nail, the finger swept round the cervix, when rapid dilatation took place, and delivery was effected by forceps. In the case of a multipara a faint ridge in the cervix was the only sign of the os; this was readily entered by the finger, and dilatation promptly followed. In addition, Campbell reported two cases of septa in the vagina, and also the case of a primipara brought to the hospital in labor, in whom the vaginal orifice was smaller and situated further forward than usual. It was supposed that the anniotic liquid was gradually escaping; the head could be felt in the pelvis, covered by a thick membrane. Under an anæsthetic, it was found that the supposed vagina was the dilated urethra. The gradual escape of urine had been mistaken for the passage of the anniotic liquid. When the hymen which had persisted was severed the vagina was found normal, and delivery followed. The patient never entirely regained power of retaining urine.

[To the foregoing may be added those cases of abnormally thickened cervix with adherent fetal membranes which result from chronic endocervical inflammation, often gonorrhœal in origin. This condition may be suspected when dilatation is extremely slow, the membranes failing to protrude into the os. In the first stages of labor the gauze tampon plays a most useful part in the treatment of these cases. If the end of the gauze be carried through the os and within the cervix, the membranes will be gradually loosened. Elastic dilators are usually incompetent to secure dilatation in these cases, and multiple incision of the cervix, followed by the use of the elastic bags, is indicated.

In a recent case of incomplete abortion at six and one-half months, the editor had occasion to employ gauze packing for two days, followed by multiple incision and dilatation, with delivery of the fetus piecemeal. The membranes were entirely adherent, as was also the placenta.—ED.]

GYNECOLOGY.

 UNDER THE CHARGE OF

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Myomata of the Large Intestine.—PFANNENSTIEL (*Centralblatt für Gynäkologie*, No. 20, 1897), examining a patient who entered the hospital on account of progressive emaciation and complete incontinence of urine, found her pelvis filled by a smooth, hard, firmly adherent tumor, which pushed the uterus and bladder upward. Another similar growth the size of a child's head lay above and to the right of the symphysis. By distending the rectum with gas the first tumor was found to be retro-intestinal.

On opening the abdomen the upper growth was seen to lie behind the descending colon, and was enucleated by splitting the mesentery. It was attached to the posterior surface of the colon by a fleshy pedicle, which was ligated, severed with the Paquelin, and the peritoneum sutured over the stump. The removal of the intra-pelvic growth was attended with great difficulty. An incision was made in the posterior layer of the left broad ligament, the pararectal tissue was divided with the cautery, and the tumor was seized with a volsella and drawn forcibly upward, being enucleated partly with the finger and partly with the cautery. The cavity remaining was drained per vaginam, and the uterus and rectum were sutured together in order to shut it off from the abdominal cavity.

Microscopical examination of the specimens showed that they were pure myomata, with no trace of sarcomatous degeneration. The writer infers that they could only have developed from the mucous membrane of the intestines.

Adenomatoid Growths of the Tubal Mucosa in Tuberculosis.—WOLFF (*Ibid.*), in examining a Fallopian tube with unusually thick walls, found on the mucosa a number of nodules the size of a bean. The macroscopical diagnosis of carcinoma was made, but under the microscope the nodules were found to be cheesy in spots, and contained many giant-cells and tubercle-bacilli. Beside the giant-cells there were glandular pouches lined with cylindrical epithelium, from the walls of which extended epithelial processes. The writer explains this glandular development as due to hypertrophy of the epithelium of the tubal folds, resulting from the inflammatory process attending the development of the tubercles. This harmonizes with the statements of Saenger and Barth, that all neoplasms of the tubal mucosa are papillary in character. Since it is probable that true adenoma cannot develop from the mucosa, since the presence of glands is doubtful, he suggests for the growth described the term "adenomatoid."

Diagnosis of Tubal and Peritoneal Tuberculosis.—BULINS (*Ibid.*) states that "salpingitis isthmica nodosa" is not always of tuberculous origin, as has been asserted, but clinically, in the absence of positive microscopical

evidence, the presence of circumscribed nodules in a tube is to be regarded as proof of a tuberculous rather than of a gonorrhœal origin. The diagnosis would be strengthened by the detection of numerous small, hard nodules in the pelvis (from the size of a pin's head to that of a cherry). The latter are usually situated in the broad ligaments and in the serous covering of the uterus and adnexa, and impart a rough sensation to the examining finger like that of a file; or they may form a chain along the sacro-uterine ligaments and on the postero-lateral walls of the pelvis, more frequently on the right side. These are to be distinguished from secondary carcinomatous and papillomatous growths, as well as from the small herpetiform vesicles which are found on the tubes and in the upper portions of the broad ligaments. The latter are small localized transudates; unlike tubercles, they do not give the sensation of circumscribed nodules.

The Vaginal Route.—DÖDERLEIN (*Ibid.*), in a paper read before the German Gynecological Congress, takes a conservative position with reference to this subject. While in severe cases of "ascending gonorrhœa" he approves of the French plan to extirpate the uterus with the adnexa, he does not favor the ablation of the comparatively healthy organ simply to allow more room for the removal of the tubes and ovaries, unless the latter form tumors too large to be enucleated otherwise. In general the presence of such non-purulent enlargements constitutes an indication for abdominal section, by which more conservative work can be done. That the recognition of the proper limitations of the vaginal route is difficult he admits. In five cases in which he began the operation per vaginam he was obliged to desist and open the abdomen, while in four others in which he intended to remove the adnexa alone he was compelled to extirpate the uterus on account of uncontrollable hemorrhage.

After a fair comparison of anterior and posterior colpotomy, he prefers the latter as being simpler and attended with less traumatism. He now employs the former incision only in enucleating fibroids from the anterior uterine wall, and reaching cysts in the vesico-uterine pouch.

Having had recurrences after vagino-fixation of the uterus, he is inclined to adopt this method of treating retroflexion only in carefully selected cases.

He does not employ clamps except in total extirpation of the uterus.

BUMM, in opening the discussion, held that the cancerous uterus should be removed per vaginam when it is not too large and the disease has not extended to the glands and parametric tissues. When the latter are extensively involved, any radical operation is out of the question. In non-malignant disease of the uterus requiring extirpation the vaginal route is generally preferable, also in certain forms of fibro-myoma. He thinks that the difficulties attending vaginal section for removal of the adnexa have been underestimated, since it is harder and more dangerous than cœliotomy, there being more risk of sepsis and injury to the bladder and intestine, as well as of hemorrhage. He would remove tumors of the adnexa by the vaginal route only when they are small, appear to be pedunculated, and, above all, are not firmly adherent. Accumulations of pus and blood should be attacked per vaginam only when they bulge into the fornix to a marked extent, otherwise by an extra- or intra-peritoneal incision.

OLSHAUSEN agreed with the speaker that in general the uterus should be removed through the vaginal, the adnexa through the abdominal route.

FEHLING was not disposed to abandon vaginal section, but deprecated its wide application. Cœliotomy was preferable in young subjects in whom conservative operations were to be done, and also in cases in which the diagnosis was not clear. Purulent disease of the adnexa was the chief indication for the vaginal incision. He believed that the use of the clamps simply saved time, but offered no other advantages.

MARTIN agreed with Fehling that the time was not ripe for the decision of this question. He preferred cœliotomy in cases in which the diagnosis was doubtful, and where there was a tumor of considerable size with extensive adhesions. The uterus should be spared after removal of the adnexa wherever this was possible. While there would always be a considerable number of cases in which vaginal section was indicated, there were undeniable dangers. He seldom used the clamps, in fact, would never use them unless the field of operation was clearly exposed to the eye. Closure of the peritoneal cavity was most desirable. His own mortality in 454 cases had been less than 1 per cent.

CHROBAK affirmed that in vaginal section visceral lesions were more apt to be caused and overlooked than in cœliotomy. He would lay down two rules. 1. In operating per vaginam one must always be prepared to open the abdomen; 2. The surgeon should never bind himself to finish the operation by the vaginal route, but should tell the patient that he will do what seems best at the time.

Gonorrhœa of the Bladder.—WERTHEIM (*Zeitschrift für Geb. und Gynäkologie*, Band xxxv., Heft 1) reports a case of gonorrhœa in a child nine years of age, which was followed by acute inflammation of the bladder. A bit of the vesical mucosa, removed per urethram, was examined microscopically and fresh cultures were made. Numbers of gonococci were observed between the epithelial cells, as well as in the lumen of the capillaries ("gonorrhœal thrombo-phlebitis"). The latter occurrence explains the mode of development of gonorrhœal arthritis and endocarditis. In the case reported suppuration of both elbow-joints took place. The patient was cured in four weeks.

LINDHOLM (*Finska Läk. Handbujar; Centralblatt für Gynäkologie*, No. 21, 1897) observed a case of gonorrhœa in a young girl, in the course of which acute vesical symptoms developed. The urine contained gonococci, and by cystoscopy the vesical mucosa was seen to be deeply congested, with superficial loss of tissue. The cystitis was cured by irrigation with warm boric acid solution and instillations of a 1 per cent solution of nitrate of silver.

Treatment of Gonorrhœa.—BALTZ (*Monatschrift für prakt. Dermatologie; Centralblatt für Gynäkologie*, No. 21, 1897) reports the results of the treatment of gonorrhœa with argonin in 158 cases. The usual strength of the solution was 3 per cent., though one of double this strength was employed in obstinate cases. The writer infers that: 1. Gonococci disappear from the urine in about three weeks under this treatment; 2. Solutions varying in strength from 3 to 7½ per cent. cause no irritation; 3. The cure in cases of acute, hemorrhagic cystitis is prompt.

PIÉRY (*Gaz. hebdom. de Méd. et de Chir.*, No. 56, 1896) speaks highly of the therapeutic action of nascent carbonic acid in gonorrhœal affections of the female genital tract. He employs a mixture consisting of seven parts of bicarbonate of sodium and six parts of tartaric acid. An ounce of this powder is introduced into the vagina through a cylindrical speculum, or in a gauze bag. Tartrate of sodium and carbonic acid result from the combination; the latter has an anæsthetic effect, quickly relieving the local irritation, while the tartaric acid renders the vaginal secretion strongly acid, thus cutting short the period of vitality of the gonococci.

KINES (*Centralblatt für Gynäkologie*, No. 21, 1897) makes a novel suggestion with reference to the treatment of gonorrhœa of connective tissues. He advises permanent irrigation of the affected parts with water at a temperature of 40° C. He also places the patient in a bath of the same degree for twelve hours, the idea being to keep the entire body temperature so high as actually to kill the gonococci, which, he maintains, can be effected without any marked general disturbance.

Acute Intercurrent Enlargement of the Ovaries.—GOTTSCHALK (*Deutsche med. Wochenschrift*, No. 50, 1896) reports the following interesting phenomena noted in four cases after curettement with a sharp instrument for the relief of simple menorrhagia, previous examination having demonstrated the fact that the adnexa were normal. Convalescence was afebrile, and the patients were discharged cured. From one to three weeks later, corresponding to the time of menstruation (which, however, did not appear) the patients were suddenly seized with pain in one ovarian region. Examination showed that the corresponding ovary was considerably enlarged, its fellow being also larger than before, and exceedingly painful to the touch. In one instance it attained the size of an orange. The temperature was never elevated, and under rest and palliative treatment the ovaries soon returned to their normal size. With the next menstruation the phenomenon again occurred, but was less marked, and the enlarged ovaries were longer in regaining their normal size. The writer explains the condition as follows: Congestion and regeneration of the endometrium are the normal accompaniments of menstruation. When the mucosa is absent, as after curettement, there occurs a vicarious hemorrhage into the ruptured Graafian follicle, which is already closed by blood-clot; the sac becomes overdistended, hence the enlargement of the ovary and accompanying pain. Hematocele may, of course, result if the pressure becomes great. Similar hemorrhages may occur into unruptured follicles. The practical importance of this condition is evident in connection with the differential diagnosis of early ectopic gestation. The absence of the pulsation usually noted in the ectopic sac is of considerable clinical value.

Nodular Forms of Tubal Disease.—RIESS (*Journal of Experimental Medicine*, vol. ii., No. 4) concludes a paper on this subject as follows: Nodular enlargement of the tube may be due to several different pathological conditions, the exact diagnosis of which can be made only after microscopical examination. Nodules may be congenital or acquired, and of inflammatory or non-inflammatory origin. They may be present at any part of the tube,

and show the characteristic anatomical structure of that part. Epithelial formations develop from the mucosa (salpingitis pseudo-follicularis), from the accessory tubes (intraparietal parasalpinx, hydro-parasalpinx), or from remains of the Wolffian body (adenomyoma). Epithelioid growths spring from the endothelium of the peritoneal covering.

Connective-tissue nodules are the result of a previous interstitial salpingitis.

Localized muscular hypertrophy may be of inflammatory or non-inflammatory origin (adenomyoma). Round-cell accumulations are due to inflammation, either specific (gonorrhœal, tuberculous), or non-specific (disseminated interstitial or purulent salpingitis).

Ectopic gestation causes epithelioid nodules through the production of pseudo-membranes.

PÆDIATRICS.

UNDER THE CHARGE OF

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Riga's Disease.—FEDE (*Archiv f. Kinderheilkunde*, 1897, Bd. xxxi., S. 351) describes under this name an affection frequent in Italy, two cases of which have been reported in France by Brun and by Dufournier. It appears as a small lenticular tumor, grayish in color, about two centimetres in length and a half centimetre in thickness, developed upon the lower surface and the frænum of the tongue. As it is observed almost exclusively in nurslings that have cut the lower incisors, it has been attributed to irritation of the tongue by these teeth or by the alveolar border of the lower maxilla in infants that have not yet cut them. Clinically, there are three varieties of the affection: 1. The child is in good health, and simple sublingual tumor exists. 2. The tumor, which has existed already for some time, is accompanied by another affection, such as gastro-intestinal disturbance, tuberculosis, etc., so that the infant is cachectic and the tumor increases in size and shows no tendency toward cure. 3. From the beginning the disease is accompanied by grave general disturbance, leading finally to death. Histologically the tumor is a papilloma, formed by hypertrophy and hyperplasia of the mucosa, principally of the papillary layer. If ulceration occur, the surface is infiltrated with small cells separated in places by a fibrillary network of fibrin.

Pre-natal Infection in Diseases of Infancy—EDWARD P. DAVIS (*Archives of Pediatrics*, September, 1897, p. 641) presents an important study of a class of cases of obscure infection in the first few weeks of life, the characteristic of which is a disorganized state of the blood manifested by

hemorrhages from the bowel, sometimes from the vagina, urethra, nose, mouth, and, in extreme cases, from the skin. Such cases have been variously described under the name of Winckel's disease, hemorrhagic disease of the newborn, hæmoglobinaemia, and other titles. With these, as a class differing from the hemorrhagic cases only in degree and not in kind, the author includes cases seen not infrequently in private practice, which do not go to the point of actual hemorrhage, but in which the newborn child gradually develops green stools, prostration, convulsions, coma, and death.

For preliminary data he examined the blood, milk, and placental tissue of a number of apparently healthy, though as a rule anæmic, mothers in the maternity department of the Jefferson College Hospital, as well as the blood and feces of their infants; and it was found that there was no correspondence between the number of blood-corpuscles or percentage of hæmoglobin in a given mother and the same in her infant. The placenta of these mothers, examined immediately after delivery, gave negative bacteriological findings, though it has been abundantly proved that the acute infections, like typhoid, tuberculosis, and sepsis, pass through the placenta. It must be accepted, then, that under ordinary conditions the placenta at birth is a sterile substance.

In 57 per cent. of the mothers the milk before the first nursing was sterile; in the remaining 43 per cent. the ordinary pyogenic bacteria were present, namely, the staphylococcus pyogenes albus and aureus, as has been observed by others. Mammary abscess, however, did not develop in any of these women.

The examination of the feces of the infants showed that in over 11 per cent. micro-organisms were present in the meconium before the first nursing; in 33½ per cent. after nursing, while the remainder failed to show the presence of intestinal bacteria. The organisms found were the staphylococcus albus in most cases, the *s. aureus* and minor forms in others, while in one the bacillus coli communis was present. These observations, while not extensive, seem to point to the fact that in the milk of the mother there may be present organisms capable of setting up infection in the infant's intestine with resulting toxæmia. There was no septic condition in any of the mothers or in the attendants of the hospital, and thorough antiseptic precautions were taken with all women before labor.

During the progress of these investigations a number of cases, varying in severity, arose among the infants examined, in which green stools, variations of temperature, hemorrhages, and in two cases a fatal result developed. The mother of one of these children was in good condition, but its feces, passed before nursing, contained the staphylococcus pyogenes albus in pure culture. This child manifested the symptoms described, and died. The autopsy revealed briefly the following: Kidneys swollen, dark, and oozing with blood; the mesenteric and retroperitoneal glands greatly swollen, but not caseous; the liver also; the suprarenal capsules contained clotted blood; the walls of the ventricles were relaxed and contained clotted blood. In this instance it is possible, the author thinks, that the child's disease arose from germs already present in its intestine at birth.

In the second fatal case neither mother nor child showed an abnormal condition of blood at birth; no bacteria were obtained from the milk, nor were

any found in the baby's intestine soon after birth; but the child died after eleven days, with a temperature of 106° F., and multiple hemorrhages from all mucous surfaces. The feces of this infant contained the bacillus coli communis and the micrococcus pyogenes aureus. The mother of this child became uræmic before its birth, and the author is inclined to attribute much of the infant's condition to the mother's deficient excretion.

All infants showing a tendency to green stools, discharge of blood, or hemorrhages from mucous surfaces, were therefore treated by copious intestinal irrigations with normal salt solution; the result, with the exception of the two cases mentioned, was gradual improvement. Although the mother's milk could not be proved in all cases to be at fault, still, unless prompt improvement followed the irrigation, breast-nursing was suspended for a partially digested milk mixture. No other method of treatment seemed of the slightest avail.

The author has isolated from three fatal cases of acute hæmoglobinæmia a germ resembling that associated with yellow fever, which is capable of transmission through pregnant animals to their young.

New Methods of Resuscitating Stillborn and Feeble-born Infants.—BEDFORD BROWN (*Therapeutic Gazette*, 1897, vol. xxi., No. 6) in a timely paper under this heading distinguishes between the stillborn and deadborn thus: In both conditions the vital functions are in a state of absolute suspension—in the deadborn, permanently; in the other, temporarily. Again, in the one the vital functions cannot be resuscitated, while in the other they can be restored. In the stillborn infant the cardiac sounds are absent, and there is entire suspension of the pulse; the muscles are perfectly limp and relaxed; the function of respiration is absolutely suspended; yet the vital spark is retained and capable of being restored to vigorous life. In the feeble-born the cardiac sounds are barely perceptible; the function of respiration amounts to a mere occasional sigh or gasp; the reflex functions of the cord are greatly impaired, and so are sensation and muscular or voluntary action.

The most certain test to distinguish between the stillborn and the deadborn is the temperature. In the former the rectal temperature may be two or three degrees below the normal; in the latter ten or fifteen degrees below normal will be registered. The maintenance of a temperature near normal, then, offers the most significant indication for persistence in efforts at resuscitation. The author has seen infants restored after twenty or more minutes of total suspension of cardiac action and respiration.

Another valuable sign is the state of the pupil. In the dead the pupil is widely dilated, while in the stillborn it is but little, if at all, relaxed.

In the treatment of stillborn and feeble-born infants the author has found that subcutaneous medication is the most efficient and successful method. First, he inserts in each arm, by hypodermic syringe, four or five drops of whiskey and a single drop of tincture of belladonna. The stillborn infant will usually respond quickly and promptly to this stimulation. If there is no response, or a very feeble one, he injects a drachm or two of warm, sterilized water under the skin, and about two drachms with a drop of aromatic spirits of ammonia into the bowel, and then awaits results. The first indication of a response to these hypodermic remedies is soon mani-

fested; the muscles of the eyelids contract, and the eyes, previously closed, suddenly open; the respiratory muscles act, the glottis opens, air is inhaled, and suddenly exhaled with the well-known cry. The heart begins to beat, and pulsation appears at the wrist. In his observation the respiration has always been restored before the action of the heart. In case of marked cyanosis he has found subcutaneous injection of warm water at a temperature of 102° or 103° flushed the skin, aided in oxygenation, stimulated the heart, and increased the temperature. The application of dry heat by means of a well-covered hot-water bag should follow the treatment in all cases. The hypodermics may be repeated according to necessity until deglutition is established, when a drop each of aromatic spirits, tincture of belladonna, and brandy may be given in warm milk or tea until reaction is thoroughly established.

Motor Aphasia at the Beginning of Scarlatina.—BRASCH (*Berliner klinische Wochenschrift*, 1897, No. 2, S. 30) reports a case of scarlatina in a girl, aged three and one-half years, in which motor aphasia appeared on the fourth or fifth day of the eruption, thus differing from the usual time of appearance, which is late in the disease, ordinarily about the time of appearance of renal symptoms, and is a symptom of uræmia. In the case reported the speech-disturbance disappeared after fifteen days.

The author has searched the literature, but has found no other case of aphasia at the beginning of scarlatina. The observation shows that the prognosis of aphasia in these cases in children is good.

Poisoning by Bromoform.—Since the introduction of bromoform by Stepp, in 1889, for the treatment of pertussis, not a few cases of poisoning have been reported. Boergner has collected fourteen cases, and recently in discussion (*Der Kinderarzt*, 1897, viii. 49) LANGE, of Leipzig, reported a fatal case in an older child who had taken the ordinary dose. REMBE, at the same time, gave the notes of another case, fortunately not fatal, occurring in his own practice. The patient was a boy, aged seven years. Under the use of antipyrin the paroxysms averaged about six daily. He was prevailed upon by the parents to substitute bromoform. Five drops were given three times daily. About a week later the child became unconscious shortly after receiving from six to eight drops given by mistake in addition to the regular evening dose. The boy was comatose, and could not be roused by any form of irritation. The limbs were completely relaxed, and he could not swallow. Respiration and pulse were both normal. Coffee with brandy was ordered, to be given when the patient became able to swallow. By next morning the boy was well, except for slight drowsiness. No paroxysm of whooping had occurred since the extra dose had been administered.

The appearance of the boy when first seen was as one deeply chloroformed, and it is probable that in the system bromoform gives origin to chloroform. The whole dose ingested during the evening probably did not exceed fifteen drops. The case, therefore, offers a warning against any but the most careful administration of the drug.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Etiology of Meningitis.—The study of a case of circumscribed basilar meningitis which resulted from middle-ear disease has led WOLF to review the literature of similar cases, more particularly as regards the etiology of the disease (*Berliner klinische Wochenschrift*, 1897, No. 10).

In Wolf's case the autopsy revealed an old softened thrombus in the right lateral sinus and in one of the veins of the pia mater opening into it. About this was an area of purulent inflammation in both pia and dura mater. There had been chronic median otitis of the right side extending into the right mastoid process. The lungs showed recent catarrhal pneumonia.

Bacteriological examination of the pus from the meningeal lesion showed the presence of the pneumococcus of Fränkel in pure culture. The identity of the germ was confirmed by various culture and staining methods and by animal inoculations.

Search of the literature disclosed records of 174 similar cases in which bacteriological examinations had been made. The results of these examinations showed the meningitis to have been caused by the pneumococcus in 44.23 per cent. of the cases; by the meningococcus intracellularis in 34.48 per cent.; by the staphylococcus in 3.45 per cent.; by the streptococcus in 8.05 per cent.; by the bacillus pneumoniae Friedländer in 1.13 per cent.; by the bacillus typhosus in 2.87 per cent.; by the bacillus Neumann-Schäffer in 1.72 per cent., and by bacillus coli communis, bacillus pyrogenes foetidus, bacillus aërogenes meningitis, and bacillus mallei in 2.87 per cent. of the cases.

No bacteria were found in 1.15 per cent. of the cases.

It is thus clear that purulent meningitis is not necessarily the result of infection by any one particular species of bacteria, but that a very considerable number of species are capable of acting as its cause. Nevertheless, it is noticeable that the pneumococcus, the meningococcus intracellularis, and the streptococcus together compose the etiological factor in about 86 per cent. of the cases.

On Tyrosin in the Urine—Some time ago attention was called by ULRICH to the fact that leucin is in small quantity a normal ingredient of the urine. A recent paper by the same author records the results of a large number of observations as to the occurrence of tyrosin in the urine in health and in various conditions of disease.

In his study he proposes a new method for the detection of tyrosin in small quantity. The urine is first evaporated to dryness and is then gently heated, the containing vessel being covered with a glass plate or funnel. The tyrosin sublimes and deposits on the cool glass in its characteristic crystalline form, the crystals also showing the well-known reactions of tyrosin.

Examinations of twenty different urines from normal individuals showed the presence of tyrosin in all of them. It was also found to be constantly present in cases of cirrhosis of the liver, carcinoma of the liver, gallstones, catarrhal jaundice, Weil's disease, nephritis, cystitis, gout, bronchitis, tuberculosis, typhoid fever, glycosuria, hysteria, etc. It was, however, never found in cases of well-marked diabetes.

Since leucin and tyrosin are formed in the normal intestine as a result of the action of the pancreatic juice on proteids, Ulrich attaches much importance to its absence from the urine in cases of diabetes as indicative of disease of the pancreas.—*Nordiskt medicin. Arkiv*, 1896, No. 11. Reported in *Centralblatt für innere Medizin*, 1897, No. 12, 297.

HYGIENE AND PUBLIC HEALTH.

UNDER THE CHARGE OF
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Disinfection by Formaldehyd.—DR. HANS ARONSON (*Zeitschrift für Hygiene*, xxv. p. 168), reviewing the various difficulties to be overcome in disinfection by formaldehyd, mentions the fact that if the strength of the formalin solution exceeds 40 per cent. a polymeride of formaldehyd, the solid paraformaldehyd, is formed and separates, and if one heats the solution further, a solid tenacious mass forms on the bottom of the vessel and finally begins to burn. To avoid this difficulty it was proposed to heat the formalin in solution with methyl alcohol ("holzin"); but this process has been found to be by no means free from disadvantages. Polymerization occurs, large amounts of wood alcohol are evaporated to no purpose, and large volumes of formaldehyd cannot be disengaged in a short time. Next, it was proposed to develop the formaldehyd directly by oxidation of wood alcohol by means of lamps constructed for the purpose. Various lamps were devised and tried, but the results in every case proved to be more or less unsatisfactory. The process proved to be expensive, the yield of active gas was not large, many lamps were needed for even small rooms, and the use of the lamps was not devoid of danger. The next step was to employ an apparatus in which a solution of formaldehyd was heated strongly under pressure of three atmospheres with the addition of calcium chloride to prevent polymerization. This, however, proved defective in several particulars, and in addition was very expensive. Aronson claims to have found a simple safe apparatus which will develop large volumes of gas in a short time from the solid paraformaldehyd in the form of pastilles. It consists of a metallic

cylindrical shell beneath which is an alcohol lamp provided with several wicks. In the upper part of the shell hangs a cup for the pastilles, and in its sides are a number of slits through which the heated products of combustion of the alcohol must pass. The pastilles, which weigh one gramme each, are placed in the cup, the lamp is lighted, and the hot gases of combustion transform the solid polymeride into formaldehyd gas and mix thoroughly with it, and at the same time contribute the necessary amount of moisture to prevent polymerization. The gas is disengaged with great rapidity and diffuses evenly.

The lamp is filled with ordinary alcohol to the extent of twice as many cubic centimetres as there are pastilles in the cup. The wicks must project only slightly, so that the apparatus shall not get too hot. The manipulation of the apparatus is very simple and free from danger. It is best to place the lamp on a metal plate on the floor of the room. All openings in the room are closed, and after leaving it the alcohol is allowed to burn out.

Aronson experimented in a room of 100 cubic metres capacity, in which the test objects were placed at different levels. It made no difference whether they were placed on the floor, half-way up, or near the ceiling, which fact demonstrates the uniform diffusion of the gas, which has a specific gravity about the same as that of air.

The test objects used were staphylococcus, streptococcus, bacillus pyocyaneus, the bacilli of typhoid and diphtheria, anthrax spores, and tubercle bacilli. These were prepared in various ways on gauze, paper, linen, and woollen, in thin and thick layers and in moist and dry conditions.

In the first series of experiments two lamps were used, each with 100 pastilles; that is to say, two grammes of the disinfectant for each cubic metre of air space. The objects were distributed, the lamps lighted, the room closed and left so for twenty-four hours. On opening the room the odor was so strong that a person could stay but a very short time in the room without suffering intense irritation of the eyes and coughing. On opening the windows the smell was soon removed. All the test objects were found to be completely sterilized.

In the second series but one lamp was used with 100 pastilles. All the test objects were completely sterilized within twenty-four hours, with the exception of anthrax spores.

Aronson agrees with Vaillard and L  moine and others that the penetrating power of the agent is not considerable. Objects wrapped in several layers of filter paper or in thin linen are disinfected, but placed in the middle of feather pillows they are not acted upon sufficiently. All surfaces should be exposed as much as possible. For the higher organisms Aronson claims that formaldehyd is non-poisonous. Animals, such as rabbits, left in the rooms during disinfection are not killed, and section fails to show what one would expect, intense inflammation and irritation of the bronchi.

[The conclusions of Aronson as to the action of the agent on animal life are not in accordance with the experience of several practical disinfectors in this country.—Ed.]

Cholera and Flies.—SURGEON-CAPTAIN W. J. BUCHANAN (*Indian Medical Gazette*, March, 1897) gives an account of an outbreak of cholera in Burd-

wan jail, which he regards as a case of strong presumptive evidence in favor of the theory that flies may spread disease. Nine cases of cholera, four of which were fatal, occurred in six different sleeping wards. All of those affected had been over a month in jail, excepting the second person to be taken, who had been there but seven days, and another attacked later, who had been there twelve days. There had been no prevalence of diarrhœa before, during, or after the outbreak, and at the time the jail was exceptionally free from bowel complaints. The water-supply was practically above suspicion, and so was the milk. The number of male inmates was 190, of whom ninety belonged to the "infirm gang." There were also about ten women inmates. The water-supply was the same for all persons in the jail. The milk was boiled before use, but none of those attacked were given milk. The "infirm gang" worked and slept in association with the ordinary prisoners, but their food was specially cooked and they were fed in a separate place in the hospital compound. The others were fed and had their food cooked at the extreme opposite corner diagonally from the hospital. None of the "infirm gang," nor the women, nor the hospital patients, nor the attendants, nor the staff of the jail were attacked.

Just outside the jail walls, at the corner where the ordinary prisoners were fed, were a deserted compound and row of dirty huts, where a year ago had been a number of fatal cases of cholera. Outside, at the other end diagonally from where the "infirm gang" were fed, were a jail-tank and garden, both clean. At the time, the city was more than usually troubled with swarms of flies, and just before the outbreak a strong E.N.E. wind was blowing. The theory of the officials is that swarms of flies were blown by this wind from the huts into the jail-yard, where, on reaching the trees and corner of the high jail wall, they obtained shelter from the storm and settled on the food exposed on plates before the gang which fed at this corner. It is certain that all the affected prisoners were fed at this place on the evening of the storm. Supposing the infection to have been brought inside the jail at this time, the periods of incubation were as follows: One of from twenty-four to thirty-six hours; six of from three to four hours; one of six days; one of seven days.

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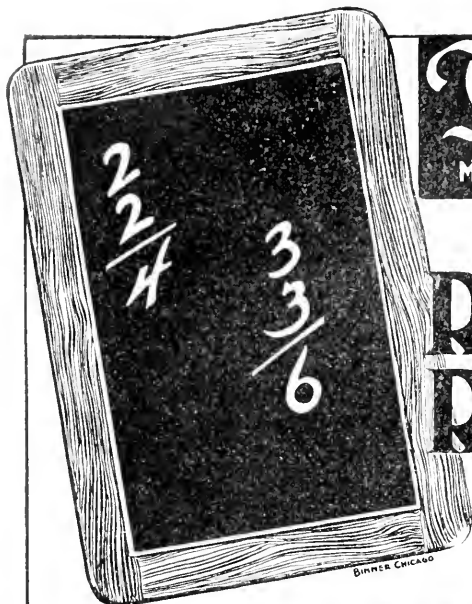
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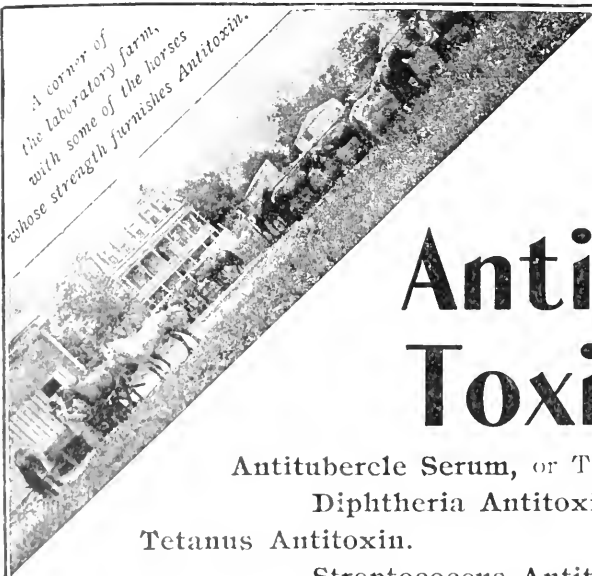
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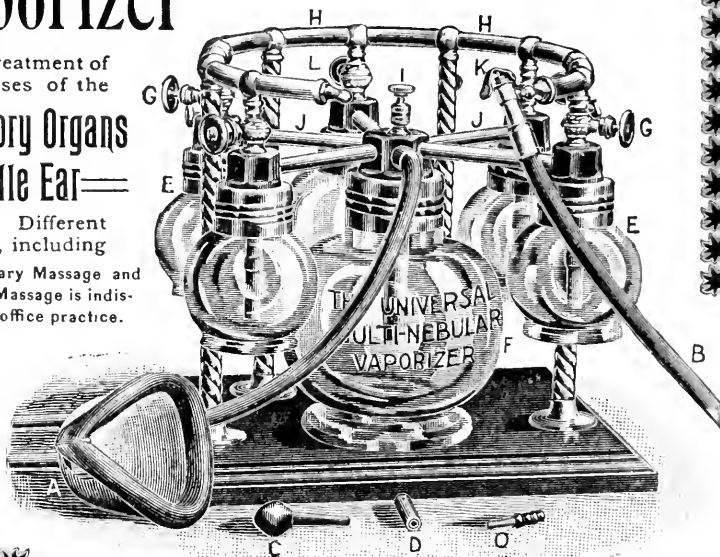
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PARIS, February 12, 1897.

"The collections of **disintegrated** or **broken down vesical or renal calculi** which forms the subject of the following analysis and researches, were sent me by Doctor Edward Chambers Laird, resident physician Buffalo Lithia Springs, Virginia, U. S. A. They were discharged by different patients after the use of the mineral water of Buffalo Lithia Spring No. 2 for a variable time.

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CALCULUS "B."—This **disintegrated vesical calculus** presents itself in the form of **many fragments** of a granular aspect of a greyish white color. *They are easily broken, and the texture of the fragments show that they are porous throughout.* Chemical composition: Urate of ammonia—for the greater part; carbonate of ammonia and magnesia—in small quantity.

CALCULUS "C."—**Vesical calculus reduced to crystalline powder**, granular, of a greyish white color, rather friable. Chemical composition: Phosphate of ammonia and magnesia—for the greater part. Carbonate of lime—small quantity. Oxalate of lime—very small quantity.

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we believe, than any known remedy. It was thoroughly tested last summer and did not fail in any case when administered in time....

Peptenzyme differs in every essential feature from all digestive products in use, and is less expensive, considering its digestive power and properties. Prepared in the form of Tablets, Powder and Elixir.

Send for Samples and Pamphlets Describing Peptenzyme in Full.

REED & CARNRICK NEW YORK.

Remedy in Nervous Disorders when Characterized by Melancholia.

—Mode of Exhibition.—

The "Reference Book of Practical Therapeutics," by Frank P. Foster, M. D., Editor *The New York Medical Journal*, which has recently been issued by D. Appleton Co., of New York City, contains an article of which the following is an excerpt, which we feel expresses the consensus of medical opinion adduced by actual results: "Antikamnia is an American preparation that has come to extensive use as an analgetic and antiretic. It is a white, crystalline, odorless powder, having a slightly aromatic taste, soluble in hot water, almost insoluble in cold water, but more fully soluble in alcohol.

"As an antipyretic it acts rather more powerfully than antipyrine or acetanilide, but innocently, and it has the advantage of being free, or almost free from any depressing effect on the heart. Some observers even think that it exerts a sustaining action on the circulation. As an analgetic it is characterized by promptness of action and freedom from the disagreeable effects of the

narcotics. It has been much used, and with very favorable results in neuralgia, influenza and various nervous disorders characterized by melancholia. The dose of antikamnia is from three to ten grains, and it is most conveniently given in the form of tablets."

We may add, that the best vehicles, in our experience, for the exhibition of antikamnia are Simple Elixir, Adjuvant Elixir or Aromatic Elixir, as also brandy, wine or whiskey. It can also be readily given in cachets or capsules, but preferably tablets, as well as dry on the tongue in powder form, followed by a swallow of water. When dispensed in cachets or capsules it should be put into them dry. Antikamnia tablets should be crushed when very prompt effect is desired and patients should always be so instructed. The conditions of the stomach frequently present unfavorable solvent influences and they can be thus overcome.

—Notes New Pharm. Products.

In Pneumonia where there is Restlessness.

R Antikamnia (Genuine)..... 5 ij
Tinct. Digitalis..... 5 iss
Syrup Doveri..... 3 iij
Mx. Sig.:—Teaspoonful every 3 to 6 hours.

In Painful Dysmenorrhea.

R Antikamnia (Genuine)..... 5 j
Brom. Potass..... 5 ij
Elix. Aurantii..... 3 ij
Mx. Sig.:—One or two teaspoonfuls every hour in water.—*Dunglison's Clinical Record.*

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Diseases Caused by Hepatic Torpor

Does not purge, per se, but under its use the Liver and Bowels gradually resume their normal functions.

DOSE—ONE TO TWO FLUID DRACHMS, THREE TIMES A DAY.

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THE STANDARD SEDATIVE

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Absolutely uniform in purity and therapeutic power, produces clinical results which can not be obtained from the use of commercial bromide substitutes.

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**INDIGESTION, MALNUTRITION, PHTHISIS,
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DOSE—One or more teaspoonfuls three times a day. For babies, ten to fifteen drops during each feeding.

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FOR **ABNORMAL HEART ACTION.**

DOSE—One Pilet every hour, or less often as indicated.

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PROSTATIC TROUBLES OF OLD MEN—IRRITABLE BLADDER—
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OD CHEM. CO., NEW YORK.

Few diseases are marked by such tedious and unsatisfactory convalescence as is the one known as epidemic influenza. After the acute symptoms have passed away, extreme weakness and prostration remain, persisting for a long time in spite of the ordinary modes of treatment. The patient is left in a condition of general debility altogether disproportionate to the apparent gravity of the affection. Vague neuralgias and mental hallucinations occur, together with an unaccustomed liability to contract other diseases with very slight exposure, or to suffer relapses of this disease. If the patient be a brainworker he finds it especially difficult to apply himself to his usual tasks. Either physical or mental exertion is followed by profound exhaustion.

Let us now look into the actual condition present, and then we can more intelligently seek an appropriate remedy—not merely a temporary palliative.

The patient has just passed through a serious and violent disease which, although of comparatively brief duration, has profoundly affected the great nerve centers, and from which they naturally can recover but slowly. Through excessive weakness of the nervous supply of the vital organs, their functions are but feebly and imperfectly carried on. How many there are who date the beginning of a permanent state of decline to their attack of La Grippe.

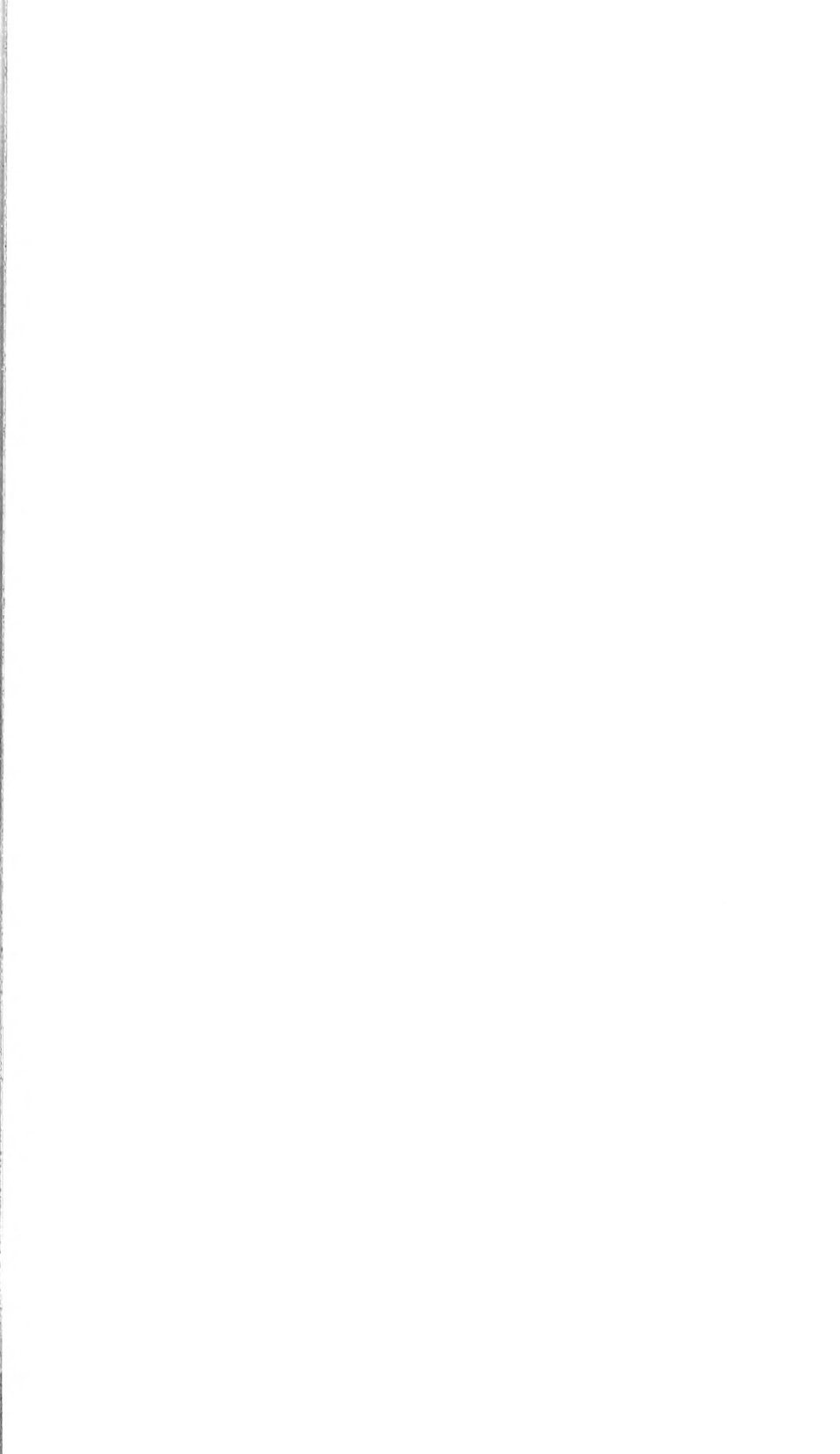
The ordinary tonics—iron, quinine, strychnine, &c.—seem utterly unable to cope with this condition. In fact, it is not stimulation that the patient needs, as by it he is only led to overtask his strength, and finally finds himself com-

pletely broken down. He needs a reconstruction of the worn out tissues.

The remedy which will be effective, then, must be one that will convey to the tissues the revivifying and vitalizing agent, phosphorus, in its oxidizable and assimilable form. Thus the true vitality of the nerve structure is restored and with it the healthy function is re-established. The process is not that of stimulation, or whipping up the exhausted powers, but is one of renewing the nutrition of the tissues themselves; hence it is steady and sure in its progress and permanent in its results. The patient feels that he is gradually recovering his accustomed strength of mind and body.

The one form in which the compounds of phosphorus, as they exist in normal animal cells can be conveyed to the tissues and there utilized is in the oxidizable form of the hypophosphites of lime and soda, chemically pure. It should be given early, and continued, at appropriate intervals, until the condition has been entirely overcome. Its favorable action in convalescence from acute diseases in general is especially marked in the disease under consideration. By its use many cases of chronic invalidism can be averted, and the susceptibility to intercurrent diseases corrected.

As it is essential to have the agent in an absolutely chemically pure form; McArthur's syrup should be prescribed. This is an agreeable, wholesome syrup, containing only the pure hypophosphites of lime and soda. If you are not already acquainted with it, a full sized bottle will be sent you, if you will agree to pay express charges. Address, The McArthur Hypophosphite Company, Boston, Mass.



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